This Week in The Iron Age

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JULY 25, 1940

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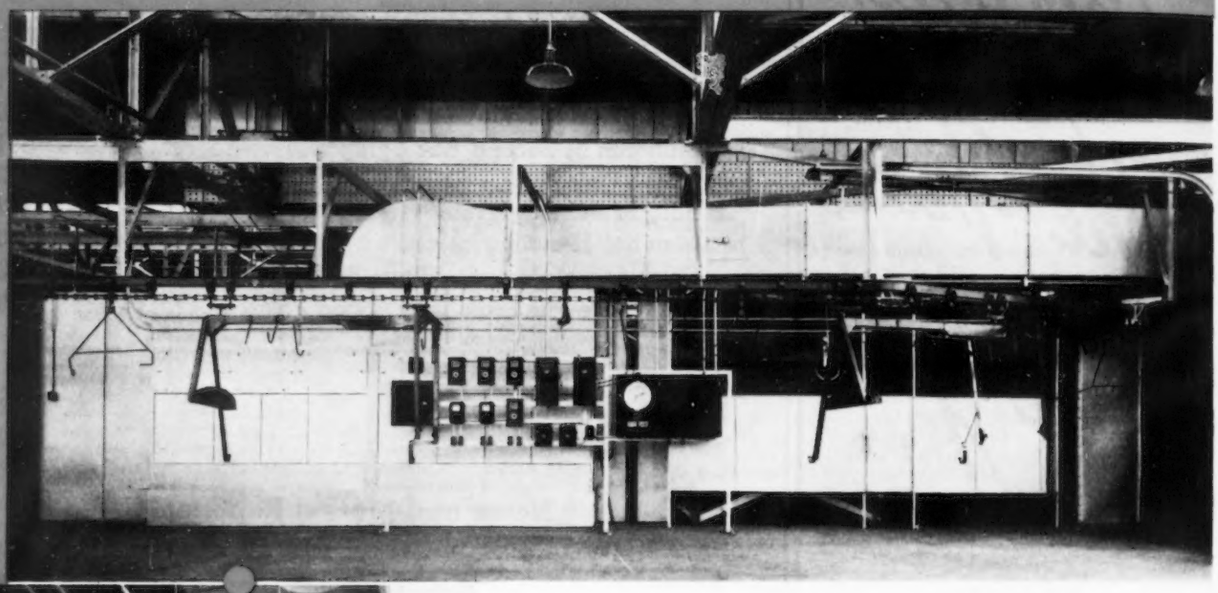
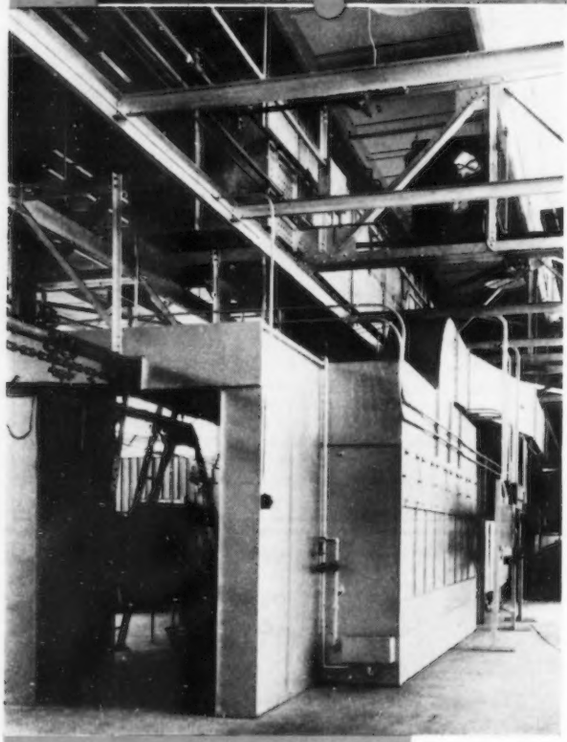
A New, Mahon ENGINEERED FINISHING SYSTEM





The top illustration shows the Hydro-Filtered Air supply, Hydro-Filter Spray Booths and operating and temperature control panels of the complete Mahon Finishing System installed at the Allis-Chalmers Plant, LaPorte, Indiana. Lower illustration shows entrance to Mahon Hydro-Filter Spray Booths—part of the same installation.

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As evidence of the tremendous savings made possible by complete modern finishing systems, of the type illustrated here, Allis-Chalmers, after operating a Mahon finishing system in their tractor plant in Milwaukee for a period of one year, installed a second complete Mahon system in their LaPorte, Indiana plant. Another complete Mahon system was recently installed in the Allis-Chalmers Pittsburgh plant. These three complete finishing systems installed for one manufacturer over a period of three years, indicates not only complete satisfaction on the part of the purchaser, but complete confidence in the Mahon engineering staff—because, each of the three installations presented distinctly different problems. In this highly specialized field Mahon engineers offer the benefits of broader experience and the results of years of research in the Mahon laboratory . . . this, plus a thorough knowledge of modern finishes and production methods, gained by Mahon engineers through close contact and cooperation with production experts in every industry, is your assurance of a better engineered, closer coordinated installation—an installation that will do a better finishing job on your particular product. Call in a Mahon engineer now—consultation will not place you under any obligation.

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MAHON

The Iron Age

JULY 25, 1940

ESTABLISHED 1855

Sell or Take Orders?

IF one were to epitomize the great problem of the world today, it might be done in a single question. "Shall we continue to buy and sell or shall we issue and take orders?"

This is a question worth thinking about in these days when force is replacing free will and persuasion in so many countries, including our own.

The American System of Free Enterprise, like our Democracy itself, was established and nurtured on salesmanship. When the need for salesmanship or the right to exercise it goes out of the window, then our Democracy and our Free Enterprise system go with it.

Salesmanship and selling are simply the process through which a transaction is induced through the disclosure of mutual advantages to buyer and seller. It has applied in America and other democracies to political, financial, commercial and personal transactions.

All buying and selling, as we know it, has been based upon this principle of mutual advantage. It has applied to the purchase of a pound of coffee, an automobile, a home, a factory or a railroad. It has applied to the man looking for employment and to the man seeking a wife. It even applies to religion, for a man joins a church in the hope of getting to Heaven and with the belief that the Lord will be glad to have him come there.

In America, political liberty and freedom of enterprise have been inextricably interwoven with freedom of transaction. This, expressed through the impelling power of salesmanship, has made us the World's most prosperous nation. And reciprocally, this inter-dependent relationship has raised American buying and selling technique to an unsurpassed level.

But times are changing. Force is edging free will out of the picture in many countries of the world, including our own.

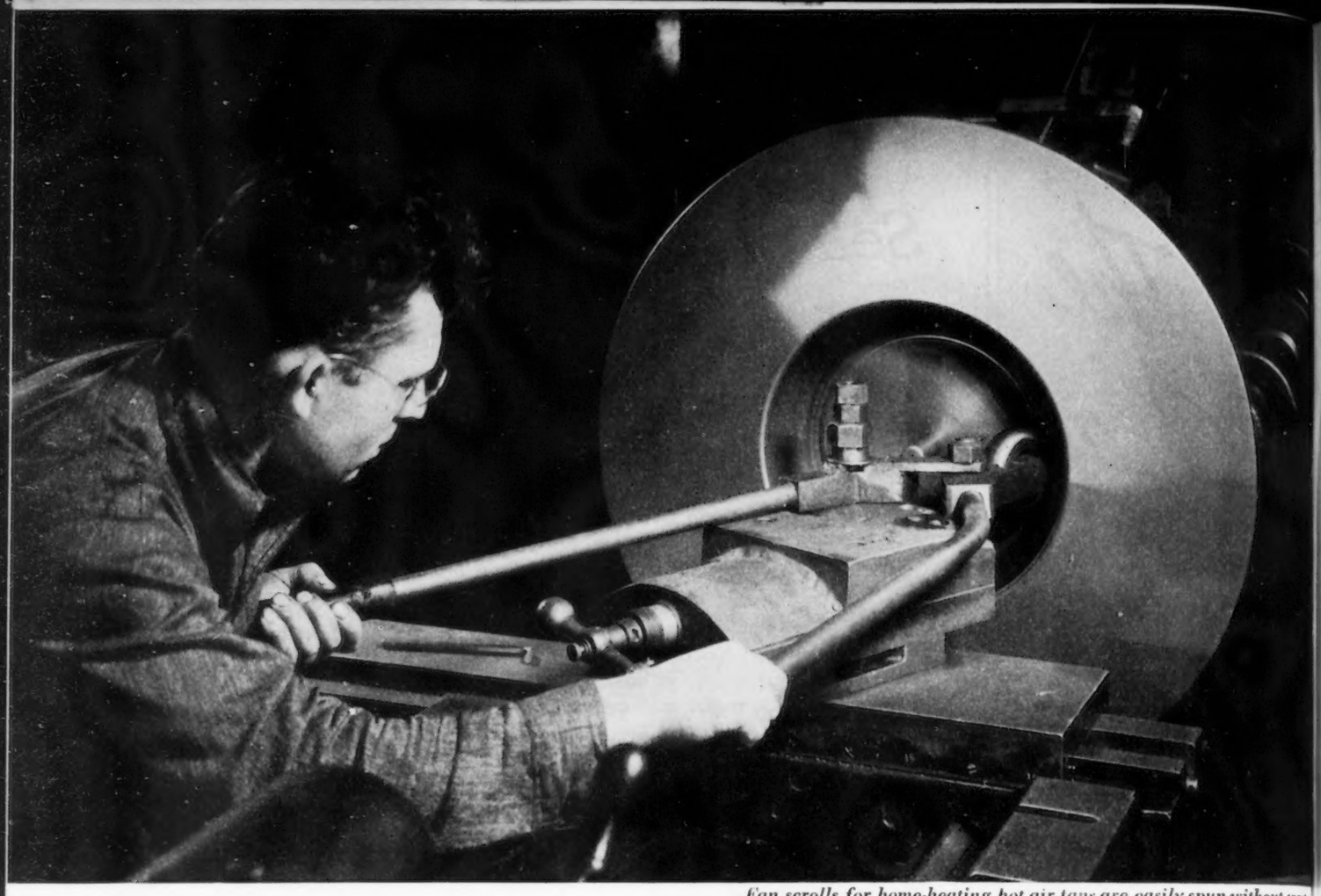
Force is not always exercised to overcome free will through the medium of war. We are not at war here in the United States, yet force has been edging its way in and free will and free enterprise out.

You have evidence of that in the realm of politics in the "order taking" at the Chicago convention. In the field of labor relations you find it in the onesided Wagner Act and the backsided Labor Relations Board. You find it in a thousand other appointed commissions and bodies whose decisions assume the force of law without legal procedure.

Every one of these things is a pressure that is pushing free will out of the picture and weakening our system of Free Enterprise. It is substituting order giving and order taking for buying and selling. It is elevating the crime of compulsion and degrading the art of persuasion.

We do not fight these menaces in this country with bullets. We fight them with ballots. The time is coming when men who value the exercise of free will must unite to preserve it. Otherwise these insidious forces will transform us all into order takers.

J. H. Van Deventer



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How to Forge Tool Steel

By ADAM M. STEEVER
Superintendent, Columbia Tool Steel Co., Chicago Heights, Ill.

FIG. 1—(Top) Ingot structure of high speed steel near ingot surface; (upper middle) structure at center of ingot; (lower middle) structure obtaining after forging to billet; (bottom) structure obtained in finished bar after reforging from billet.

OF interest at all times, but particularly so in these warlike times, is the forging of tool steel, an operation that requires great skill and about which there is little operating data. The author herein sets down much of this useful information. Among the subjects covered are heating and furnace atmospheres, cogging, reheating, forging, finishing, etc.

THE manufacture of tool steel is a highly specialized and surprisingly involved matter. The industry produces 50 or more standard types of these high-physical-property steels. Due to their characteristics and wide range of sizes and shapes, they require a considerable degree of individual care and attention for the proper control of quality. In addition to this, the maker is constantly narrowing limits of one kind or another and making other changes to improve his product. This compels him to develop his own working technique and results in constant research on his methods of production.

Since quality of the product depends upon correct and controlled manufacturing procedure, the manufacturing methods are of vital interest to the consumer.

Tool steel is made by practical men skilled as melters, hammersmiths, and rollers, each one knowing his art and willing to accept guidance from the chemical and metallurgical engineer.

Good tool steel can only be made in the melting furnace where the chemistry and potential physical properties are fixed. Tool steel first takes form as a casting in the shape of the ingot. Assuming that melting and composition have been completed in the process of ingot casting, there are important factors that govern the ingot quality of any particular tool steel. The first is ingot design and the second is casting temperature.

Steel shrinks upon solidification and some method must be provided to eliminate severe piping due to shrinkage. This is controlled by the design of the ingot, it being larger on the top than on the bottom and having tapered sides. Also, a shrink head can be placed above the mold which will hold sufficient liquid steel to feed the ingot during the process of solidification. Such a design of mold will permit solidification to start at the bottom where the cross-section is smallest and progress to the top, permitting the liquid steel to feed down into the ingot during the process of solidification. When ingots cool the crystals tend to separate in an unequal fashion, usually arranging themselves in what is known as a dendrite structure. Such a structure can be compared to a fir tree appearance; a string of crystals forms and shoots off branches which, in turn, shoot off other branches at right angles to them; this is repeated until the structure has an appearance similar to a pine tree. These crystals are generally large and their as-cast size will depend upon the rate at which they are cooled from a specific temperature, which varies somewhat in ac-

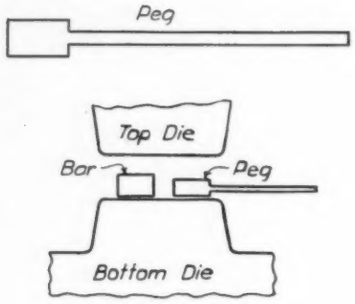


FIG. 2—Peg used in hammer forging.

cordance with the composition of the steel.

The larger the size of all metallic crystals, other things being equal, the lesser is their adhesion and in the same degree their general mechanical properties. On the other hand, the smaller the crystals the better is their adhesion and mechanical properties. It is evident, therefore, that small crystals are desirable in the ultimate bar and it is for this reason that hot mechanical working such as forging and rolling is employed. Mechanical working breaks up these large crystals, refines the casting structure and produces proper grain size and homogeneity.

As this article deals with the forging of tool steel, it is necessary to discuss briefly the effect of hammering metals to present a true picture of what actually happens during this important operation.

Forging is a function of impact. Impact causes plastic flow in the heated metal but during the operation, the metal is continually cooling and this retards its ability to flow—hence the time for the operation is limited.

The principle of the forging hammer is that of an instantaneous application of force applied to a relatively small area governed by the size of the dies and the section of the metal being forged. Deformation only occurs as long as the force of the blow is in motion. It must overcome the initial resistance to deformation of the metal. The increased density of the metal due to working and also the friction of the metal in contact with the hammer dies retard its ability to flow. This resistance of metal to deformation under impact, combined with the intermittent action of the hammer, makes forging a slow process compared with rolling. The strains set up in the metal are compressive and take place in a vertical direction in a region below the area subjected to the force of the blow. The crowding of the metal into one region, however, causes a small portion of the blow to be transmitted in horizontal directions. The suddenness of the blow tends to localize the effect and confine the refinement of the structure to the exterior. If the work is rotated between blows, the resulting flow of the metal is continuous during this process and almost entirely in a longitudinal direction which establishes grain flow and indicates the direction of mechanical working. Therefore, any segregates present in the metal are elongated and torn apart.

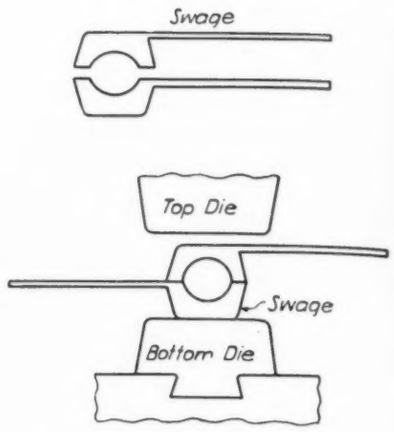
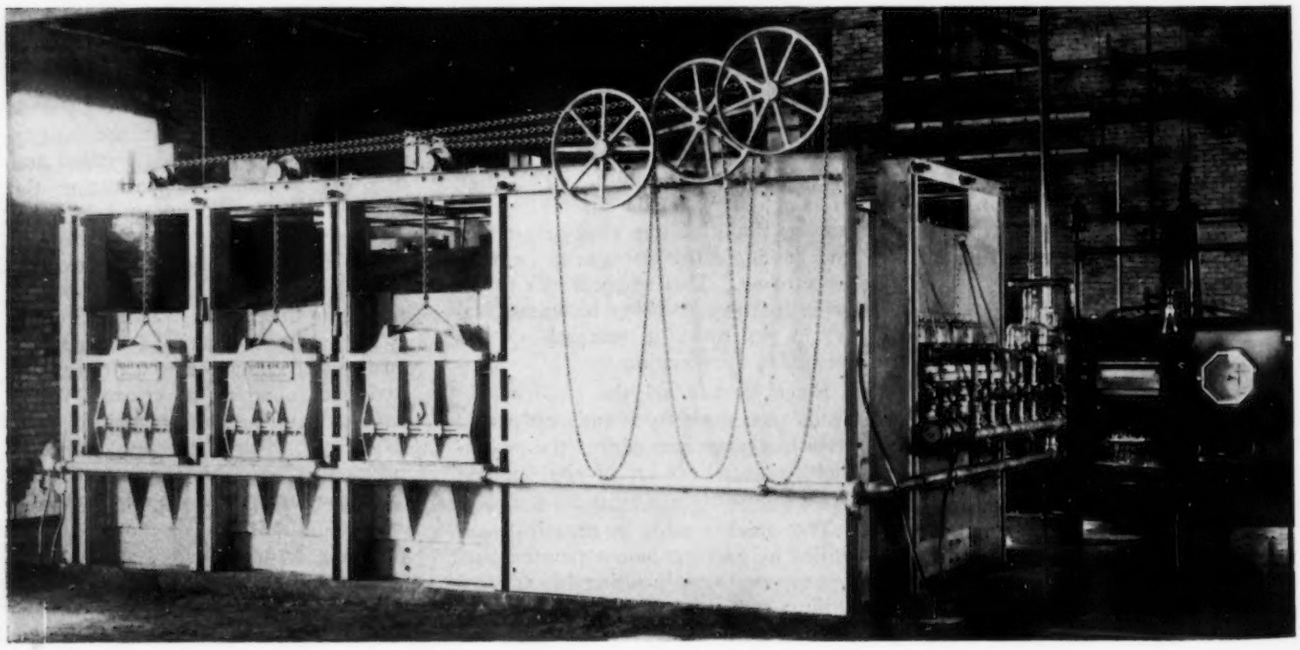


FIG. 3—Swage used in hammer forging.

In the forging of tool steel there are four principal steps: (1) Heating for forging; (2) ingot cogging; (3) surface conditioning of the billet; and (4) finish forging.

It is generally recognized that the quality of forging work can be no better than the heating method. In the manufacture of fine steels, one of the most important problems is the absolute control of the heating processes. These steels have a wide application for precision tools of all classes and depend upon subsequent heat treat-



INGOT and billet gas heating furnace with a capacity of 30,000 lb. per charge. This furnace has atmosphere, pressure and automatic temperature control.

ments for their ultimate properties. Before the advent of accurate heating control, the manufacturer had many perplexing problems that were attributed to improper heating of product. Some of these problems concerned the rate of heating, maximum heating temperatures, control of time at maximum temperature and scaling or decarburization of product.

Heating rate, generally speaking, has been much too slow and with time control of maximum temperature and atmosphere and well designed furnaces, it has been found possible to increase speed of heating materially and at the same time actually produce greater uniformity and much less surface decomposition. This has been the outgrowth of the use of gas for fuel and positive pressure blowers with full pyrometer control.

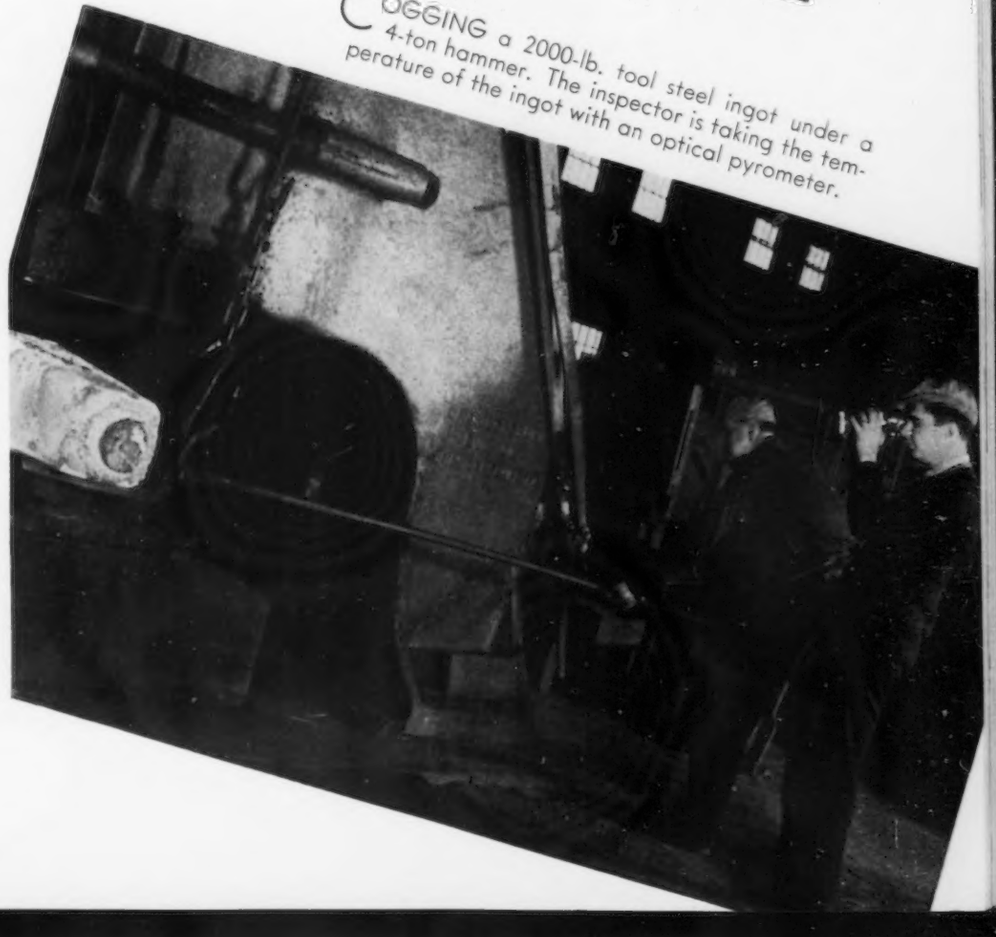
Maximum temperatures have always been a problem especially in stack vented furnaces with negative furnace pressure at the hearth. With the positive pressures now used, temperatures can be controlled without overshooting at any point and irregularities and damage can be prevented.

Overshooting of maximum temperatures, especially with improper combustion atmospheres, can result in steel which is actually burned. Burned or badly overheated tool steel is a defective product and of no value short of remelting. Burned steel is the product of irrational forging practice and the result of an extremely overheated condition in which the more fusible constituents of the steel have melted and run into the grain boundaries leaving voids between the grains. To eliminate burning, it is necessary to keep below the burning temperatures during the process of heating for forging.

Time at maximum temperature must be limited for several reasons, the most important of which is surface decomposition of the steel. The control of time at this point is largely a matter of control of temperature and uniformity of temperature preceding this. In turn, if the rate of fuel delivery is all that can be asked and the furnace condition uniform, long and variable soaking time at high temperature can be avoided.

Decarburization is a problem. This is the removal of carbon from the surface of metal by the action of media which react with carbon. The carbon content of tool steels is relatively high and ranges from about 0.60 to 2.00 per cent. Tool steels are subject to rapid decarburization when exposed to the high temperatures which are desirable for forging. To minimize decarburization, it is considered good practice to

GRINDING a billet for surface conditioning.

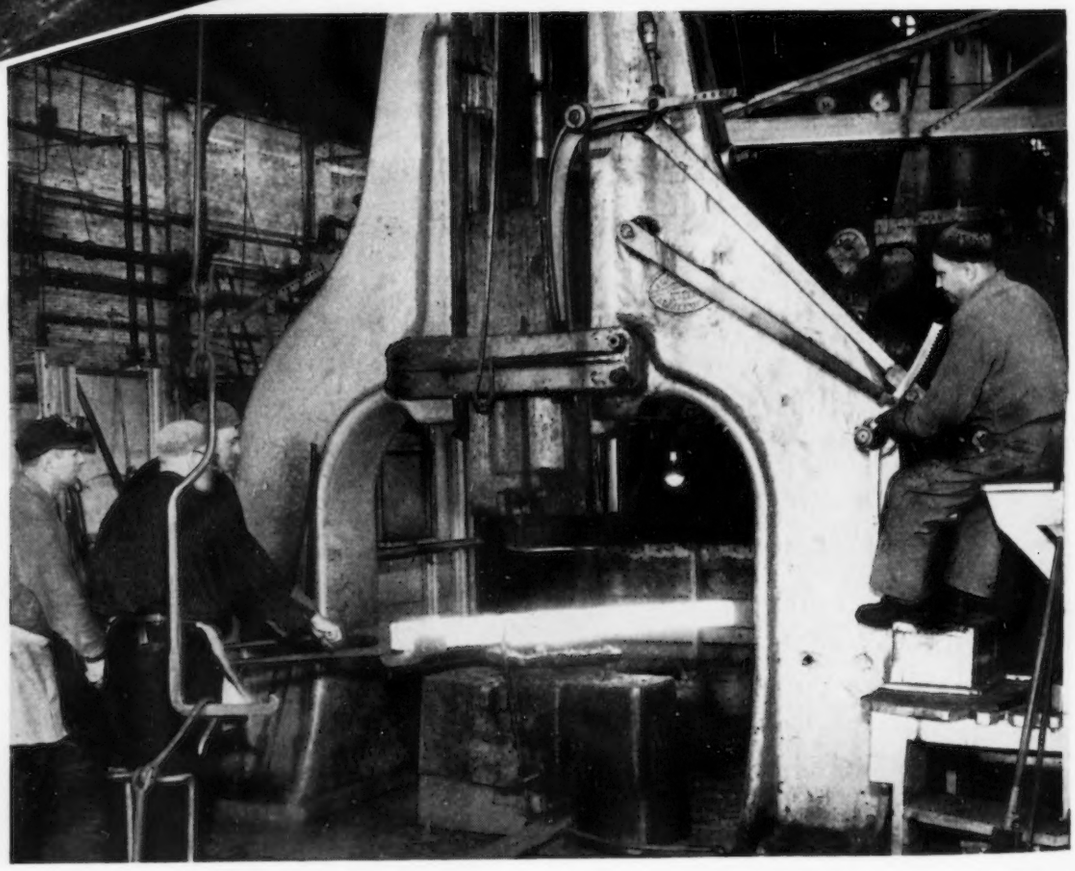


COGGING a 2000-lb. tool steel ingot under a 4-ton hammer. The inspector is taking the temperature of the ingot with an optical pyrometer.

CHIPPING a billet for surface conditioning.

preheat tool steel ingots, billets or bars before charging into the heating furnace. When a cold heating furnace is available, the product can be charged at room temperature and heated slowly to the forging temperature in predetermined steps. The product should be allowed to soak at the forging temperature a sufficient time to insure uniform heating throughout the mass before starting the forging operation but no longer. As the heating and soaking period requires many hours, depending upon the kind of steel, size of ingots or billets and sometimes upon the total weight of furnace charge and as the temperatures of the product are relatively high due to the forging needs, the hot gases surrounding the work have every opportunity to complete their reactions. It is evident, therefore, that the furnace atmosphere must be controlled if protection is to be given the product surface.

The subject of furnace atmospheres as applied to heating ferrous metals can readily be divided into two parts: first, furnaces where the materials being heated are protected from the products of combustion and where especially prepared atmospheres are introduced into the heating chamber; second, where the products of combustion come into contact with the materials being heated. This latter



FINISHING tool steel under a 3500-lb. hammer.

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FINISHING a large flat bar of tool steel under a 4-ton hammer.

type of furnace is usually called direct fired and may be commonly described as one producing a reducing or oxidizing atmosphere. The reducing atmosphere contains excess of combustible gases, whereas the oxidizing atmosphere has excess air and is made by complete combustion plus excess air. With the oxidizing atmosphere, the product oxidation as shown by the scale formation is proportionate to the excess air, other things being equal, and loss results during the heating operation.

With reducing atmospheres in direct fired furnaces where the metal is exposed to the products of combustion, decarburization predominates and scaling is slight. This is the reason a slightly oxidizing atmosphere offers the greatest advantages in the heating of tool steel for forging.

After many experiments, the most successful gas fuel atmosphere has been found for heating tool steel for forging to be one having an analysis of approximately 11.0 per cent carbon dioxide and 1.0 per cent oxygen. This atmosphere produces a fine thin scale which removes very readily during the forging operation. It also reduces decarburization to a minimum. Experience has shown 66⅔ per cent reduction of decarburization and 75 per cent reduction in scaling compared with various prior standard practices.

The control of the atmosphere ratios in the combustion zone of the furnace depends upon several factors. First, positive pressure within the furnace chamber. This prevents the infiltration of excess air. Second, short flame burners that will enable completed combustion to take place within the combustion zone and eliminate the possibility of flame impingement upon the product that will cause spot burning. Third, the exact ratio of gas to air for proper percentages of CO_2 and O_2. Combustion of the fuel under these conditions will provide an atmosphere of the analysis stated that will remain in complete equilibrium throughout the heating chamber and offer a reasonable protection for surface decarburization.

In Table I there is classified 12 types of tool steel as to type, chemical analysis, and forging classification. The latter is classed A and B. The A class includes high speed steels, high-carbon-high chromium, and other high alloys.

The data in Table II indicate the forging temperatures used with these 12 tool steels and is self-explanatory.

Ingot Cogging

The first operation in the conversion of the ingot to the finished product is called ingot cogging. This breakdown consists of sufficient mechanical working (forging) to convert the ingot into a billet resulting in approximately 50 per cent reduction of the original cross-section.

The Class A steels, Table I, are all of a segregated nature and of a coarse columnar structure in ingot form, therefore, they are in a very sensitive condition. Another important fact must be considered and that is these steels harden even with comparatively slow cooling. They, therefore, require considerable care in heating for cogging.

High speed steels and others of the Class A group are hammer cogged as soon as they have been cast.

When these ingots are stripped from the molds, they are about 1700 deg. F. all over. They are immediately charged into the heating furnaces for reheating. The heating furnace being

TABLE I

Twelve Types of Tool Steel

Steel No.	Forging Class	TYPE	C	Si	Mn	W	Cr	V	Mo	Co
1	A	high speed steel	as specified			18.00	4.00	1.00		
2	A	cobalt high speed	0.75			14.00	4.00	2.00	0.60	4.00
3	A	W hot work	0.40			14.50	3.75	0.65		
4	A	high C-high Cr	2.20	1.00		1.00	10.50			
5	A	finishing	1.30			3.25	0.55			
6	A	W alloy shock steel	as specified			2.25	1.20	0.25		
7	B	oil hardening die	0.90			0.45	1.60			
8	B	Mn oil hardening	0.90		1.15	0.50	0.50			
9	B	air hardening die	1.00				5.00		1.00	
10	B	carbon chromium	as specified				0.50			
11	B	carbon vanadium	as specified					0.15-0.40		
12	B	carbon tool steel	as specified							

TABLE II

Maximum and Minimum Forging Temperatures for Tool Steel

Steel No.	Rate of Heating, Deg. F.	Ingot and Billet Cogging, Deg. F.	Billet to Bar Finishing, Deg. F.	Do not Forge Below, Deg. F.
1	slowly to 1800	2150	2100	1700
2	slowly to 1800	2050 to 2150	2100	1800
3	slowly to 1550	2150	2050 to 2150	1650
4	slowly to 1600	1950	1800 to 1900	1600
5	slowly to 1650	2100	1950 to 2000	1700
6	slowly to 1600	2100	1850 to 1950	1550
7	slowly to 1500	2000	1800 to 1950	1600
8	slowly to 1500	2000	1800 to 1950	1600
9	slowly to 1600	2050	1950 to 2050	1750
10	slowly to 1400	2050	1800 to 2000	1500
11	slowly to 1400	2050	1800 to 2000	1500
12	slowly to 1400	2050	1800 to 2000	1500

about the same temperature as the ingots charged (about 1400 deg. F.), the 300 deg. loss is caused during the transfer from melting shop to forge shop. Special care must be taken to avoid rapid cooling during this transfer because, as previously stated, these steels harden even upon slow cooling. This hardening takes place at about 800 deg. F., which is the transformation of austenite to martensite. It results in considerable expansion which in turn sets up severe stresses within the ingot.

Upon reheating an ingot in the above physical condition, internal breakage may result across its entire cross-section at one or more points throughout its length. These ruptures may occur in the heating furnace or during the process of cogging, depending upon the degree of ingot hardness and the rate of heating during reheating. It is evident, therefore, that every precaution be taken to avoid the conditions that cause this type of failure.

The ingots are charged into the heating furnace, heated in steps to the desired forging temperature, withdrawn and placed under the hammer. The ingot having tapered sides is given a series of light hammer blows while it is moved in short steps over the dies throughout its entire length and on each face. The ingot as previously stated is in a fragile condition, necessitating great care during these first series of blows. Following this, the ingot is returned to the furnace and reheated. It is then withdrawn and given another series of blows. This time it will withstand more severe hammering because it has undergone some mechanical work with a resultant recrystallization and is, therefore, more plastic. The ingot is again returned to the heating furnace and reheated, again withdrawn and this time given more powerful hammer blows and reduced to its proper cross-section. During these cogging operations, a common defect in this group of steels is corner cracks. These cracks form across the corners of the ingot and vary from ½ in. to 3 in. in length. These cracks are removed with a tool known as a gouge, which is placed over the crack on the corner of the ingot and struck with the top hammer die which gouges out the defect.

The resultant billet is cut to weight, stamped with the proper heat number for identification, buried in a cooling bed, covered with an insulation material for slow cooling and is now ready for surface conditioning.

The Class B steels, Table I, are carbon and low alloy types. The latter are of low alloy content compared to the Class A steels, therefore, do not require the extreme care in cogging necessary for Class A steels. They are not of a highly segregated nature, but are in a sensitive condition having a coarse columnar structure in ingot form. Some hardening will result with comparatively slow cooling. When these ingots are stripped from the molds, they are cooled slowly to room temperature, removed from the cooling beds and stored for use as required.

The Class B ingots are charged for cogging into the heating furnace at approximately 1400 deg. F., and are allowed to heat and soak uniformly at this temperature. A heating program is used following this original soak by raising the temperature of the charge to the forging temperature in steps of about 400 deg. F., allowing about 1-hr. soak at forging temperature before proceeding with the forging operations.

The heated ingot is withdrawn from the heating furnace, placed on the hammer dies, and given a series of light blows while it is moved in short steps over the dies throughout its entire length and on each face. It is then moved over the dies and given another series of blows by more severe hammering, because it has undergone some recrystallization and is, therefore, more plastic. This hammering is continued until the ingot has been reduced to a billet of standard cross-section and length depending upon the size of the original ingot. Table III shows the original ingot cross-section and the size of the resultant billet.

Following ingot cogging, it is customary to condition the surface of the resultant billet by grinding or chipping to remove surface defects, surface ruptures, arising in cogging due to surface condition of the original ingot. The billet must undergo one more heating for the finishing operation and must have a surface free from defects. These defects, if present, would carry through the finishing operation to the finished product and would cause rejection and in most cases scrapping of finished product. Re-

TABLE III

Percentage Reduction Ingot to Billet

	INGOT			BILLET	
Ingot Size	Top Cross-Section, Sq. In.	Bottom Cross-Section, Sq. In.	Avergae Cross-Section, Sq. In.	Resultant Billet Cross-Section, Sq. In.	Average Per Cent Reduction
No. 4	8.25	6.0	7.125	3.50	75.8
No. 6	10.25	8.25	9.25	4.0	81.2
No. 6	10.25	8.25	9.25	5.0	70.5
No. 10	11.75	9.50	10.625	7.0	56.9
No. 14	13.50	11.0	12.25	8.0	57.0
No. 18	15.0	12.25	13.625	10.0	45.9
No. 27	17.0	15.0	16.0	12.0	43.7

moval of metal at this point would usually cause the bar dimension to be undersize.

The usual method of surface conditioning is in grinding with an emery wheel, using a swing frame grinder The other method is with the use of an air hammer and chisel. Grinding of billets has an advantage over chipping. In grinding, the wheel cuts across the surface, hence across the seam which is usually longitudinal; this causes the seam to appear more distinct, whereas, chipping along the seam has a tendency to cover or brush metal over the defect and thus makes it difficult to locate.

Billets Annealed

Certain of the high alloy types of steel must be annealed in billet form prior to grinding in order to avoid grinding cracks. Other types of steel that are slowly cooled following cogging are successfully ground without danger of grinding cracks. It is always best to grind lightly, to avoid the possibility of severe local heating which might cause grinding cracks. In some high alloy steels the billet is ground on all sides for its entire length, therefore, considerable time is required for this operation depending upon the size of the billet. This operation naturally generates heat to the extent that the billet may be too hot to touch following grinding.

The billet is now ready for finishing. Up to this point it has received an average of 50 per cent reduction in cross-section from the original ingot, and considerable recrystallization has resulted during this forging. Therefore, further working can be carried out with less danger of rupture and failure than that encountered in the cogging of the ingot.

Considerable care must be used in selecting billets for finished products. For example, consider a finished bar, Class B, 4 in. wide, 2 in. thick, 14 ft. long, finished weight about 380 lb.; the billet selection for this bar requires: (1) the proper cross-section for required reduction, which should be 85 to 95 per cent from original ingot to finished bar; (2) rough weight (allowance to be made for scale loss in heating and cropping of bar). It would be advisable to select a 5-in. square billet from ingot size 6, Table III, with a weight of 480 lb. This would result in approximately 92.5 per cent average reduction from original ingot to finished bar size and allow 100 lb. for loss in scale and cropping of bar ends.

The billet is placed in the heating furnace and heated to forging temperature (Table II). It is then withdrawn from the heating furnace and placed on the hammer dies. It is then recogged to a cross-section about 20 per cent larger in width and thickness to the finished size. This is necessary to obtain sharp bar corners, which is only possible by slow reduction. First on the width, second on the thickness. This is repeated until the bar has been forged to desired size.

Sizing by Swaging

In the case of flat bars, two tools are used to maintain size, one for the width, the other for the thickness. These tools are called "sizing pegs" and are used as shown in Fig. 2. They are made of steel, welded to a steel handle and are held upon the die by a helper. Allowance is made for shrink usually 3/16 in. per ft.; therefore, a 12-in. peg for a 12-in. bar width would measure 12 3/16 in. wide. This, of course, is necessary due to the fact that the bar is hot and the peg cold.

Billet selection and heating for round bars is the same as for flats or squares. Sizing is obtained by hammer swaging, Fig. 3. The swage is also made to shrink 3/16 in. per ft. The swage is placed between the hammer dies, the bar between the swages. As medium hammer blows are struck upon the swage, the bar is turned slowly between blows and passed through the swage.

Ten to 14 ft. (depending on the size) is a standard mill length bar of tool steel. The practice is to finish one-half or more of the bar during the first operation, reverse and reheat the remaining unfinished part of the billet, thus completing its full length.

Uniform Grain Size

Forging of tool steel plays an important part metallurgically. It has been demonstrated that ingot cogging causes a recrystallization of the structure in converting a cast ingot structure to a uniform grain size and a tearing apart and breaking of continuity with resulting greater uniformity of distribution of carbides within the structure. The finishing operation adds additional refinement of structure. It has been pointed out that heating in relation to forging has considerable influence on recrystallization. The forging temperatures, Table II, are of utmost importance to obtain the desired structure. The product must be heated uniformly to the maximum forging temperatures and finishing or final reduction must be accomplished at the lower temperatures in order to obtain the ultimate, fine structure.

Tool steels have a wide application for precision tools of all classes and depend upon subsequent heat treatments for their ultimate properties, but the uniformity of response to heat treatment can be no greater than the uniformity and effectiveness of the forging practice. It is, therefore, essential that the quality which is the outstanding characteristic of these steels be most carefully guarded in the forging which contributes such an important part.

Winning Wars Without

"NATIONS should never be surprised by their own unpreparedness. It is pardonable to be defeated, but never to be taken by surprise."—Frederick the Great.

Grim disaster sits an unwanted guest at every family table in America, invited there by reform governments altruistic and wasteful in a bitter world of jealous nations with lean bellies and consuming ambition.

Nineteen hundred years of Christianity has merely given human nature a lacquer of respectability, but has not altered the basic brutality of man to man—the law of tooth, jaw and sharp claw is still the primal law.

To stop the fighting of the jungle by soft words is like trying to drive a railroad spike with a tack hammer.

The brave and noble speeches of Chamberlain and Daladier, Roosevelt and Reynaud, sing a sorry song of sixpence with the house on fire and dynamite in the cellar. We have had the fuller life promised us in 1932—now fuller of taxes, war and sudden death by wasting this nation's substance on altruistic assets instead of putting idle millions at the lathes to make guns, construct airdromes, erect gun placements and extend vast highway systems of military value to give striking power to our military forces.

Public orators who insult the powerfully armed and invite aggression and who at the same time failed to prepare to meet the invited battle have without exception been those who couldn't or wouldn't fight themselves—whoever heard of a political orator brave on that field of battle which his oratory had invited?

The labor governments of Ramsey MacDonald, of Blum in France, of Stalin in Russia, of Norway and of Belgium have left moth-eaten armies and decayed navies—the natural products of these admirable amateurs in public affairs, noble in aspiration perhaps but ill fitted to this ruthless world of wars.

Ickes insults the dictators, but made no move to save America from the mass murder he invited. It's a safe bet he'll fight the next war to the last meal.

He made a good job of dodging combat in the last war as a Y. M. C. A. worker and he is well started to stay out of the next one in his walnut paneled dugout. If war ever comes to our shores, invited by his invective, Ickes will be truly a secretary of the "Interior."

And this is the man with countless billions at his command who let his

IN five years $60,000 has been spent for each soldier. Here's what such a sum could purchase for him

Words . . .

By COL. H. A. TOULMIIN, JR.

country go naked and defenseless when his own speeches showed he knew full well the critical demand that resources of our empire be spent on defense and every unemployed man and woman be engaged upon public works devoted to the national defense, to arsenals, airdromes, military roads and the building of the empire outposts to defend America.

What has become of the money these men have spent? Seven and a half billion dollars have been spent on the Army in five years. This is $60,000 for each soldier. One humorist has figured out the following should now be in the hands of each soldier:

6 Ford cars	$ 5,400
2 limousines	6,000
1 private chauffeur's equipment	500
1 private tank	15,000
2 trucks to haul his personal baggage and equipment	3,000
18 rifles	2,500
2 machine guns	3,000
1 private cannon	5,000
26 uniforms	1,300
2 dozen shirts	150
1 dozen silk underwear	75
5 dozen silk hose	60
3 Tuxedo suits	300
2 full dress suits	250
1 Chesterfield	125
4 silk hats	30
1 humidor with 2,000 vintage Havana cigars	1,000
1 private wine cellar, champagnes and liquors	5,000
Cash in bank	11,310
	$60,000

Three billion three hundred thousand dollars was appropriated under

the National Industrial Recovery Act of 1933, and a large part was to have been spent for the motorization and mechanization of Army tactical units and for unlimited increases of the Navy and Army.

This money was entrusted to Harold Ickes, then it was turned over the following year to Harry Hopkins, who used it not for our defense, but to add Communists to the public rolls to rake dead leaves over the corruption and waste of the WPA.

Repeat England's Mistakes

For a financial stake in China that represents the wasted expenditures of our government in a few weeks, we risk the entire nation in a series of irritating affronts to Japan. We repeat the mistake of England in guarantying help to helpless nations whom we do not have the power to assist. We encourage England and France to precipitate a general war prematurely and find ourselves unable to make good upon implied promises.

Our Army today is not equivalent to either the army of Czechoslovakia, Poland or Belgium. In a military way we are very small potatoes.

Every time we have dedicated a public bridge, a powerhouse or a dam, some leading citizen has taken this totally unrelated occasion as an excuse for inviting a fight with another nation.

It is this lack of respect for law, order and dignified conduct that provides the most fertile ground for Fifth Column activities. When we clean our own house we automatically remove the environment in which unwanted visitors thrive.

We must take the choice between national safety as the first consideration or social comforts and lazy hours. Even Russia has gone to a six-day working week. Obviously, no social security has the slightest value unless the country that extends it is safe from external aggression and is safe from external economic destruction. That is America's choice which must be made first and foremost before anything in national defense can be done.

Thereafter Fifth Column hysteria becomes immaterial. It takes two to make a Fifth Column successful—the corrupter and the corrupted. Our anxiety should be to strengthen our national internal structure. For 10 years we have taught that every man has a right to a job, that every man should be supported by the state, that every man should eat whether he works or not, that the thrifty and the diligent should share their labors with those who would not work if given a job.

We have set a premium upon slackers. For many long years we have starved our Army and Navy, spent vast sums on social security which should have been spent on national security, which should have been spent on national defense as the first line of social security. We have allowed Communism to run riot, both in the National Government and in national projects such as the WPA. That this is a fact is shown by the present eviction from WPA rolls of thousands of such agitators by recent regulations. We refused to let the CCC boys have military training when they demanded it. We took away from the CCC the reserve officers and the regular Army officers, who had made a brilliant success of it; and we disorganized this branch of the service with civilian employees so that the incompetence in the administration of the CCC camps has become a public disgrace. Instead of giving our jobless youths steady employment, as industrial apprentices, preparatory for the return of prosperity, we penned them in concentration camps and corrupted them with social workers who taught them that the government owed them a livelihood and that you do not have to work for a living.

The general body of our population likewise lost sight of the fact that only work can save this nation. Executives are not without fault in this general letting down of the national spirit in acquiescing in five-day weeks or shorter working hours for white collar forces who should have been devoting their attention in an extra effort to sell research and development work.

This is part and parcel of the poisonous assumption by state and Federal Governments of the functions of business by exercising controls over business normally in the hands of executives.

NYC a Disgrace

The National Youth Congress has put on public demonstrations that are a disgrace to the nation. It has been Communistic from stem to stern. The speeches before it are of the same brand of falsehoods and misrepresentations that are put out by the public relations bureau of Moscow. All you have to do is to lay one of these speeches alongside of Moscow's statements and you will see the identical similarity.

College youths have been corrupted by professors and instructors who are open and avowed members of the Communist party. A large proportion of our alleged educators have become avowed professional propagandists.

Professors from our state universities have attended the Communist conventions as authorized delegates and others have been equally active against the interests of the United States in preaching National Socialism and totalitarianism for us.

What America needs is a thorough moral house cleaning and regeneration. The activities of foreign agents in this country are petty compared with the corruption of the national spirit and opportunity by misguided Americans.

You only grow a crop in ground that has been well fertilized. Communism and National Socialism would fall on barren ground if the United States had adhered to respect for private initiative, freedom of capital investment, the right of the owner of a business to run it without governmental interference, and the right of a man to work where he please, when he pleased.

CIO Men Are Serfs

We speak of dictators with horror and abhorrence. No greater industrial serfdom exists than in unions composing the CIO, dominated by John L. Lewis. Their hours of labor, their contributions to "The Dictator," where they shall work and under what conditions they shall work, and whether or not they shall violate the law is within the power of one man who has exercised it like a dictator.

This whole nation has been twice on the very threshold of tremendous success in coming out of the depression only to be pushed back into industrial chaos by the selfish ambitions and struggles for power of labor dictators. There has been no consideration by them for the public interest of the men who were paying millions of dollars to support them in luxury.

The violence, the destruction of property and sudden death left by the CIO would have branded it as a prohibited organization in any other civilized government of the world. It was the CIO that imported into the United States from France its Communism of the sitdown strike. It caused riots, bloodshed, murder and willful destruction of property with local civil governments helpless and afraid, making America a by-word for anarchy. The officials of our Federal Government refused to open their mouths in the slightest protest until the Federal courts courageously protected America. The

worst our national leaders said was a verbal slap on the wrist of "a plague on both their houses."

Assistant Attorney General Arnold's courageous activity in disclosing the criminal actions of members of the American Federation of Labor is the first Government action taken by this Administration to protect the citizens from the scourge of labor rackets. Westbrook Pegler has done more to strengthen our moral fiber in this regard than any other factor—a great tribute to a press still free.

Every man in the street knows in his heart and soul that the sitdown strike was America's path to destruction as it was to France in its downward descent. Millions of law-abiding men have now been taught the arts of revolution, riot, destruction of company property, machinery and goods, and that the brutality of dictatorship is possible in the United States.

They have seen our Government prostituted in the United States by the National Labor Relations Board acting as judge, prosecutor and jury worthy of the best days of the Czar, conducting itself in a manner so revolting to every sense of fair play that sensible and patriotic rank and file of American laboring men has been nauseated at the sight. Representatives of the board have violated the law by opposing company unions when the very basis of the law is to give men the freedom to organize as they see fit.

In the words of that great soldier, Col. John Buchan, later Governor General of Canada, "Victory was won less by genius in the few than faithfulness in the many."

This is the peace-loving, home-owning, thrifty America which must be put back on its old foundations to meet the enemy from without—God save America!

Millionth-of-Second Radiographs

DEVELOPMENT of a new cold-cathode ultra high-speed X-ray tube that makes millionth-of-a-second radiographic exposures was recently described to members of the American Physical Society by Dr. C. M. Slack, research physicist for Westinghouse Electric & Mfg. Co.

It is believed that the development of the tube extends the possible usefulness of X-ray science into a wide new realm. It may make possible X-ray motion pictures and study internal strains in rapidly moving parts of motors and machinery, enabling technicians literally to see into rapidly moving opaque objects or study the effect of sudden forces on such objects.

As developed in the laboratory, the new X-ray tube contains three elements: a standard anode; a small oval-shaped metal cathode; and an auxiliary electrode which serves literally as a "trigger" to start the discharge of electrons when the tube is activated, but immediately thereafter assumes the role of focusing cup. The trigger element permits anode and cathode to be separated sufficiently to forestall formation of a low-voltage arc discharge which would prevent production of X-rays.

In laboratory experiments, research engineers took millionth-of-a-second radiographs of moving bullets, golf balls being driven from a tee, baseballs being batted, and numerous other objects.

To help create an impulse which causes the capacitors to discharge at the desired instant, a strand of fine wire in the timing circuit is placed just ahead of the golf ball, baseball, or other object to be radiographed. The X-ray tube is placed at one side, opposite the cassette containing the film, so that the object to be pictured is directly between the tube and film, and as near the latter as possible.

When moved, the object disturbs or breaks the wire and interrupts the circuit, creating the capacitor-discharging impulse. At that instant, momentary surge of X-rays is produced, and the radiograph is taken. Exposure time, approximately one microsecond, was measured by a radiograph of a high-speed bullet in flight through the air.

Many possible applications such as radiography of metals, will require more powerful tubes and equipment than those used in the laboratory tests. But the engineers believe such tubes and equipment can be built.

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X-RAYS catch bullets piercing wood: These radiographs of bullets during their course through blocks of wood are millionth-of-a-second exposures. The one radiograph shows a .22 long rifle bullet about two-thirds of the way through the plank. Another bullet of the same caliber emerging from the block literally explodes the wood.

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THESE Westinghouse engineers are preparing to take a "still" of a bullet during its passage through a block of wood.

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Metal Finishing

—Modern Units Fit Into Assembly Line Methods of Manufacture

By W. F. SHERMAN
Detroit Editor, The Iron Age

***SIXTEENTH** in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing*

PRODUCTION planning has dictated that the modern metal finishing system be fully integrated with the rest of the production system of which it is supposed to be a part. Mass output has long since overruled any idea that the paint shop, and whatever adjoins it, can be considered a side issue to the material flow chart or the assembly line. Mass output requires the coordination of all cleaning, rust-proofing, drying, painting and baking operations and permits no dislocations of other plant schedules. Imposed demands have made the modern finishing system more complete, foolproof and automatic than before this integration took place.

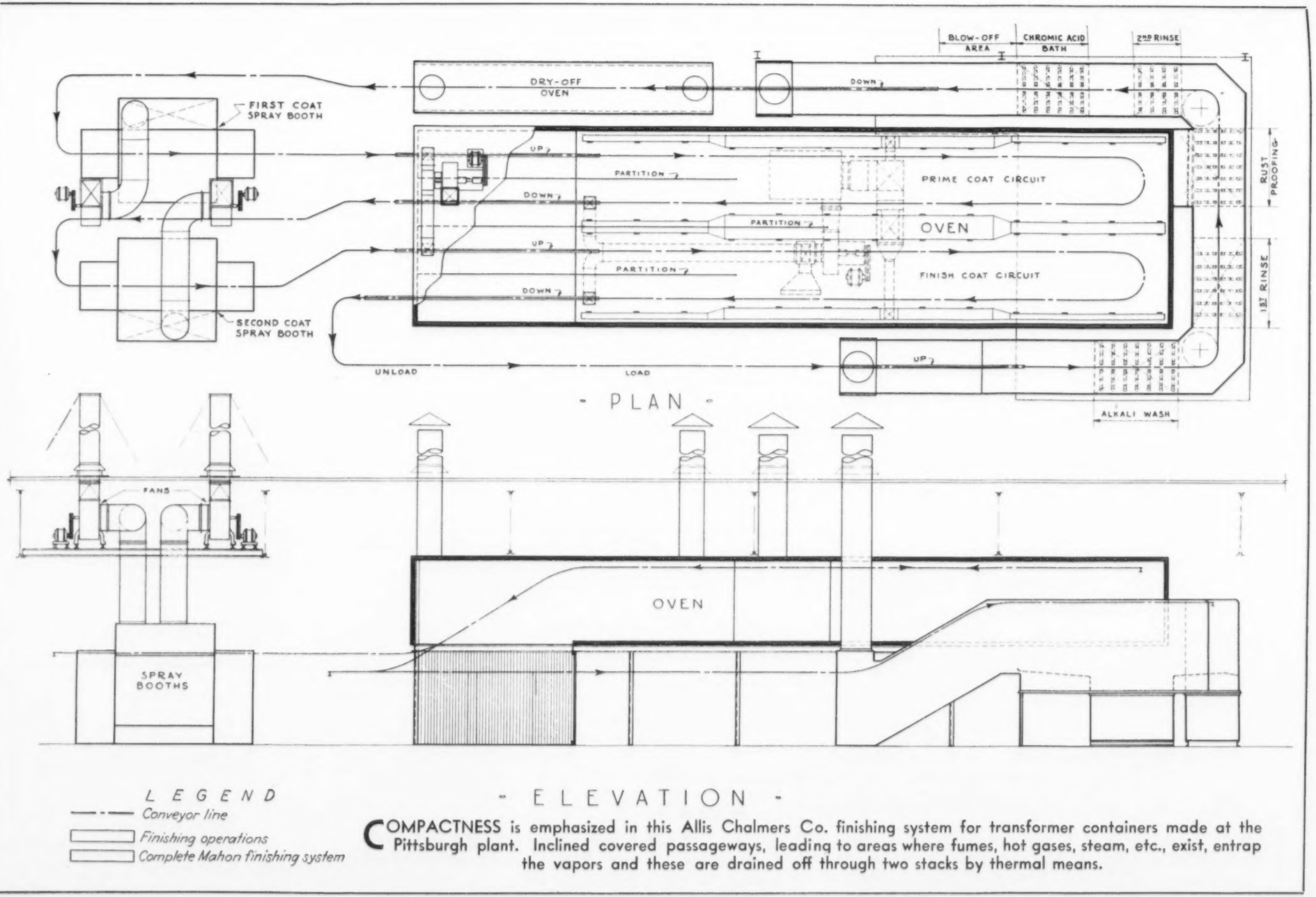
As the finishing system actually moved into the production line, or assembly line, and became part of the line, it threatened to swallow plant floor space unjustifiably. A review of current practice shows that compactness is, however, one of the outstanding virtues of recent installations, compactness being now to the point where complete finishing systems no longer represent a major use of floor space. The ideal of plant-floor economy is exemplified in cases where the installations, having been reduced to minimum sizes by the designers, are mounted in such an out-of-the-way place as the plant roof—although tied in more closely than ever with production and assembly lines. A further feature of the modern finishing system is the provision to correlate conveyor speed in cleaning baths, spray booths and ovens with the normal production speed in the rest of the plant.

One integrated unit put into operation a short time ago and illustrative of the most recent trends in finishing systems is that at the Allis Chalmers Co. plant in Pittsburgh. Tailor-made for the plant, as such systems usually are, it has the distinction now of being duplicated in other industrial plants—so it becomes readily a "typical" installation, if there is such a thing. It is a complete installation of the kind indicated above and it handles a typical industrial product through eleven typical operations, not counting loading and unloading of the conveyor. Designed in its entirety by R. C. Mahon Co., Detroit, it is distinctive and worthy of study also because it incorporates a new Mahon method of applying rust-proofing compounds in a partially reduced atmosphere.

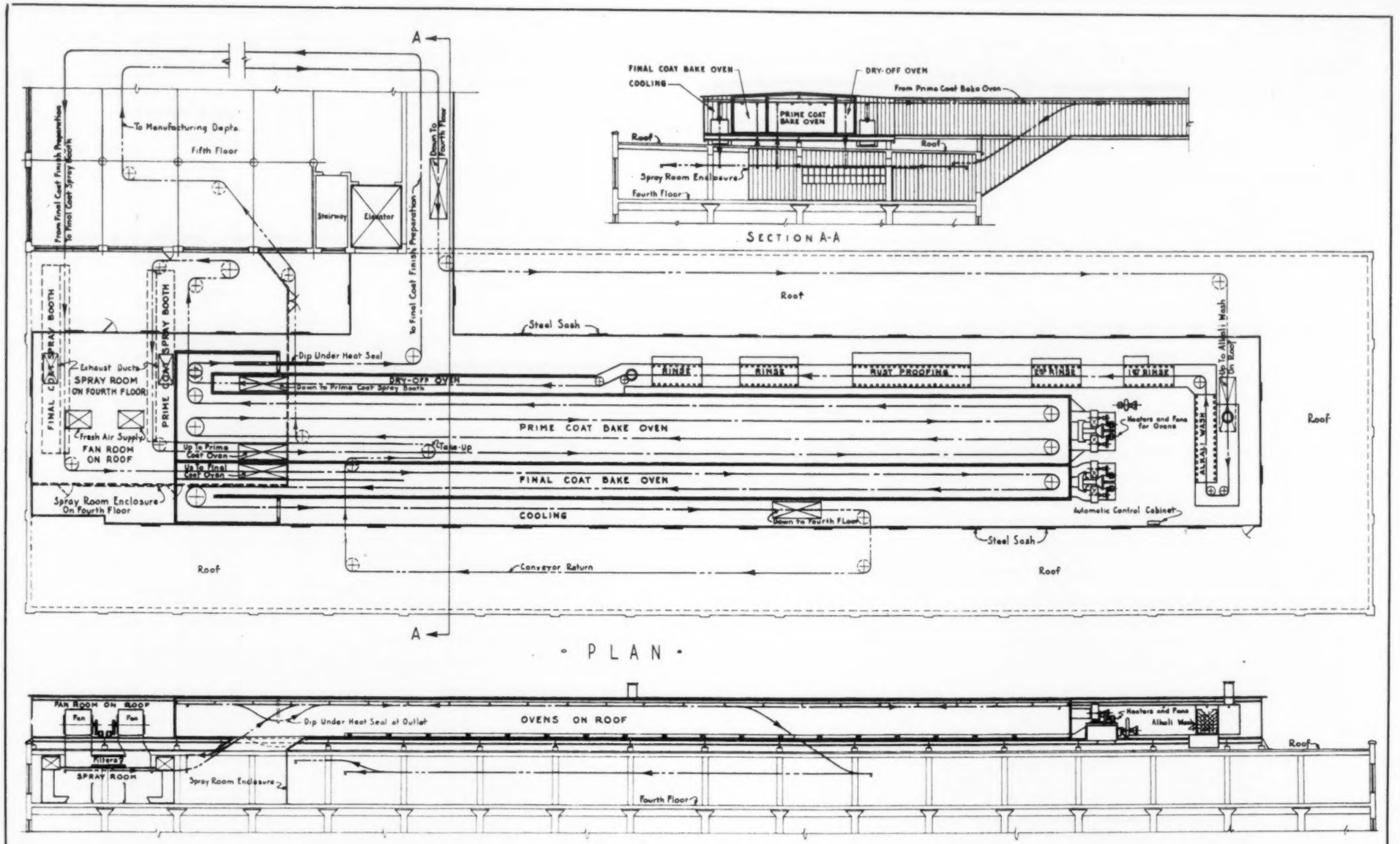
The product handled in these operations is a transformer container or tank. Sizes range from 31 in. (diameter) x 38 in. deep to the maximum which is 41 x 44 in. The system was engineered and coordinated to meet the manufacturer's specific requirements in the application of two coats of synthetic enamel in the finishing process. The cycle of operations, after loading on hangers on the conveyor chain, includes an alkali wash, hot rinse, rust-proofing, cold rinse, chromic acid bath, blow-off to remove excess water, drying in an oven, spraying prime coat, baking, spraying second coat, and final baking.

It is not necessary to expand on the initial operations more than to say that the alkali wash is a spray type, not a dip; the rinsing bath also is a spray. Each of these stages is heated by immersion type gas heaters in which the gas is burned in tubes submerged in the solution in tanks.

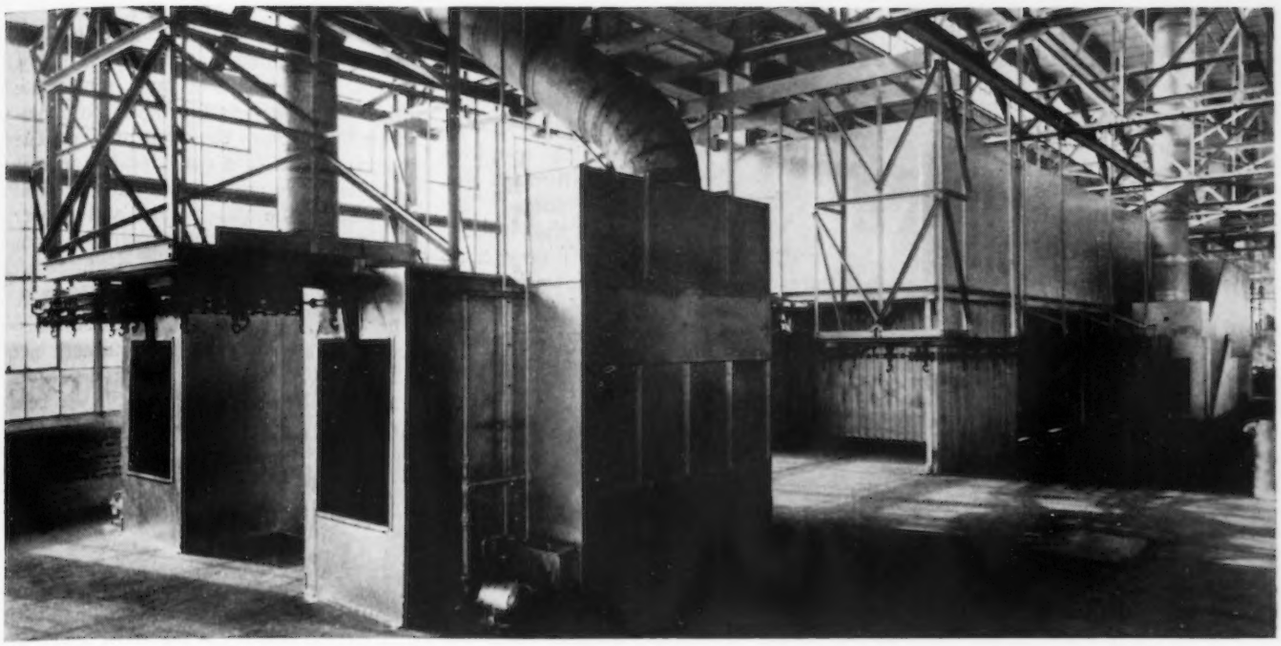
The third stage, the Parker Spra-Bonderite rust-proofing, is heated by



COMPACTNESS is emphasized in this Allis Chalmers Co. finishing system for transformer containers made at the Pittsburgh plant. Inclined covered passageways, leading to areas where fumes, hot gases, steam, etc., exist, entrap the vapors and these are drained off through two stacks by thermal means.



LABYRINTHIAN travels of the conveyor lines serve to keep products out of the regular factory during most of the finishing cycle at the Maytag plant. Most of the finishing system is on the roof of one wing of the building.



SPRAY booths and general view of Allis Chalmers unit. At the right is the load-unload station for the monorail conveyor.

a new direct-fired gas heating system of a type patented by Mahon. This burns the gas *in the processing chamber*. This method of heating eliminates build-up of scale on the heating equipment. The Bonderite solution (180 deg. F.) is sprayed on the product surface for 1 to 1½ min., a sufficient length of time to convert the metal surface to a uniform protective coating. The solution is collected and recirculated continuously.

A cold-water rinse follows the rustproofing proper, and then the tanks are given a weak chromic acid bath to neutralize possible alkali effects from tap water used in the rinse. In the blow-off area, compressed air, supplied by the blowers which provide combustion air to all gas burners, is directed into and against the tanks to remove excess liquid before the tanks go into the direct-fired drying compartment. This is a safety measure since the drying is accomplished at 350 deg. F.

Also as a safety measure, control

UNDER construction on the roof of the Maytag plant. A light framework, supporting steel roof-decking, makes up the exterior of the finishing plant. This is less expensive than using high-priced factory floor space for the installation.

WASHING machine parts passing through the cooling zone after leaving the baking oven. They are going down through the roof to the unloading station.

units on the Bonderite gas heaters are designed to cut off automatically the main gas valves in case pilot lights are extinguished, when current fails, or when gas pressure drops below a predetermined point.

An important feature of the physical layout is the fact that all operations inside the covered passageways of the finishing plant are carried on at a height above floor level. Immediately after transformer cases are hung on the monorail conveyor, it carries them up an inclined plane into a passageway which is completely covered to entrap the fumes, steam, etc., and keep dust and dirt off the product. Later, in passing through the ovens, the passageway level is higher than the one already described. This, again, affords a natural seal for the heat and entraps the fumes, heated gases, steam or air under the hooded part of the passageway to prevent their being spread out through the plant. At the point where the washing process starts and the rust-proofing process finishes there are large stacks which provide for the automatic evacuation of the heated air and fumes by thermal means. These stacks operate satisfactorily without fans because temperature differences are sufficient to provide good flow.

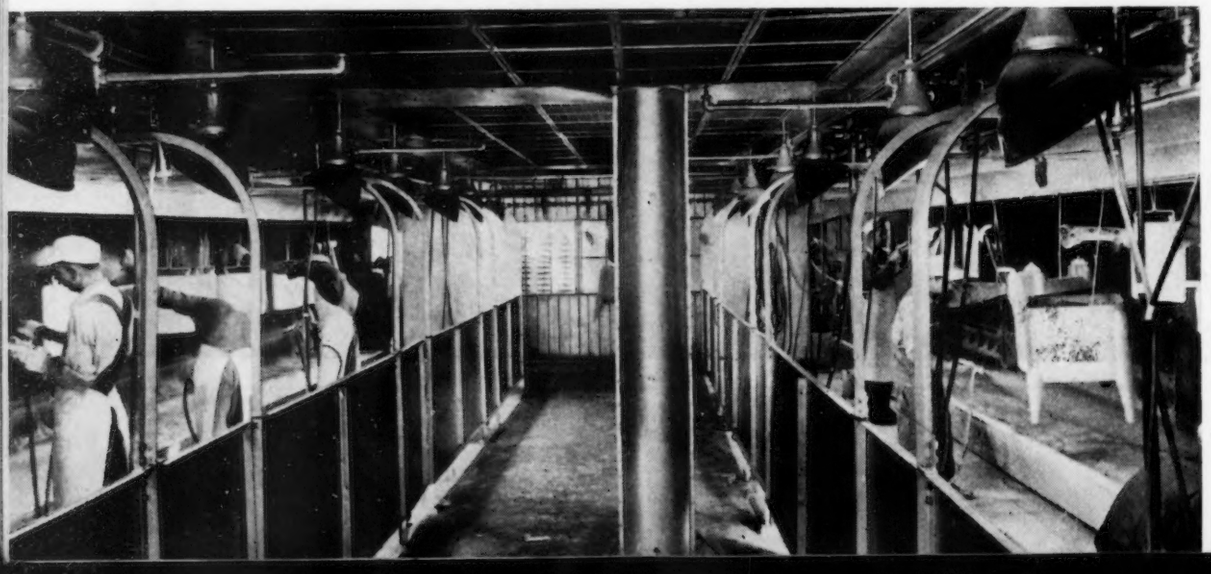
This type of installation, shown in the side view in the accompanying illustration, makes use of what is called the "partial A" type passageway. In addition to the entrapment of the heated atmosphere, this also has provided room at floor level for gages and mechanical equipment incidental to the finishing equipment.

The two Mahon Hydro-Filter spray booths are of the open top, downdraught type fitted with full flooding curtains so the entire back of the booth is flooded with water. All overspray or pigment is removed from the air in the centrifuge section of the Hydro-Filter chambers before it passes out through the exhaust fans. After each of the two spraying operations, conveyors carry the transformer containers up inclines to the baking ovens which are heated by means of a Surface Combustion direct gas-fired air heater designed to burn gas in the combustion chamber and recirculate the heated air and products of combustion through the oven proper. The recirculation of a considerable amount of the air is desired to retain the heat therein. The gas burner and blower equipment are installed on the floor directly below the raised oven.

At its normal conveyor rate of 3 ft. per min., this system handles 50 Allis-Chalmers transformer containers per hour. A variable speed drive permits a range of approximately 50 per cent above and below normal operating speed.

Special problems arise in the finishing of products in non-industrial fields —for instance, the household metal goods plant where a larger variety of products, greater production volume and finer degree of finish complicate the initial demand for merely an integrated finishing unit to tie in with mass output. Expensive factory space is sometimes sacrificed to a finishing installation, unless the finishing is planned to fit unusual requirements.

This problem has been solved at the Maytag Washing Machine Co. plant, Newton, Iowa, by the erection of the finishing system mostly on the roof of one wing of the plant. The products are shifted successively from the fifth floor to the fourth, up on the roof and through the rust-proofing process, down to the fourth floor for painting, up to drying ovens on the roof, and then to the fifth floor manufacturing space for final finish preparation. This is followed by a trip down to the fourth floor, through the final paint spray, up to the oven on the roof, down to the fourth floor, whence the conveyor returns to the manufacturing departments on the fifth floor. The point to these meanderings is that hardly more than the areas of the paint spray booths is deducted from factory floor space—and the whole is geared to the Maytag factory's normal production pace.



FIRST and second coat spray booths, Mahon Hydro-Filter type, in the spray room which is air conditioned and is the only part of the finishing system located inside the Maytag plant.

Role of Bending Presses

In the Manufacture of All-Metal Aircraft

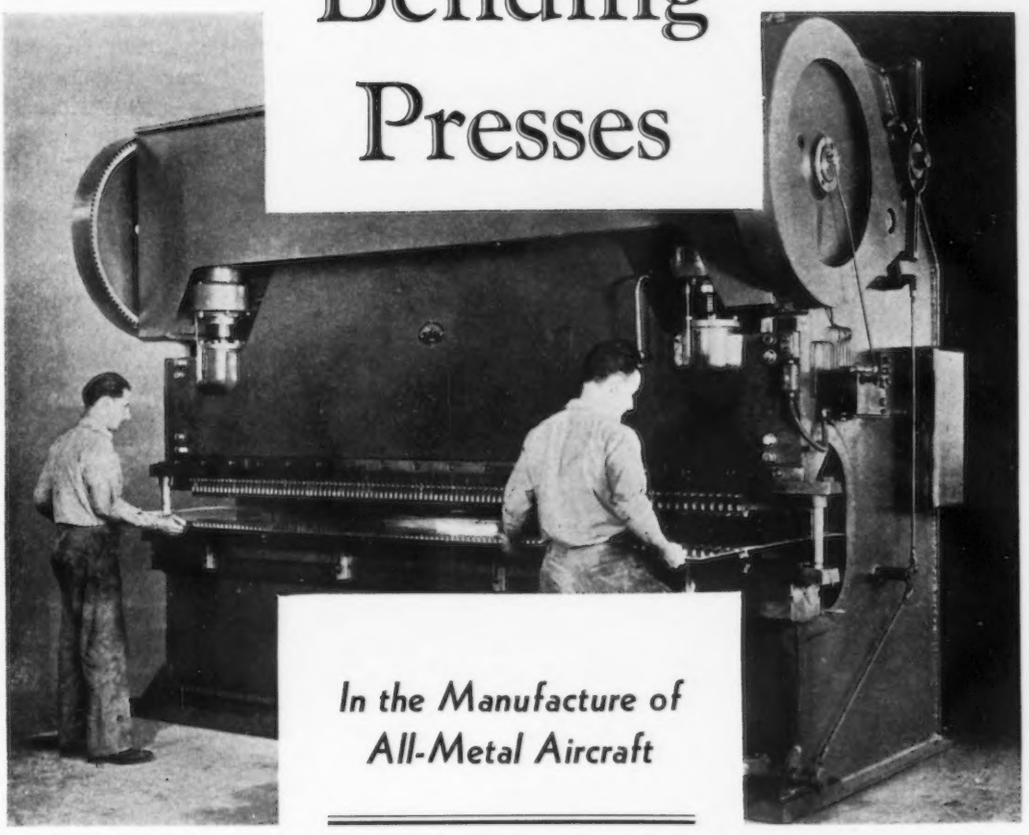


FIG. 1—This machine is punching 150 holes ranging from 0.078 in. to 0.250 in. in size at one time. Clearance between punch and dies is held to 0.0015 in. to avoid burrs.

By C. L. PETERSON

Steelweld Machinery Division, Cleveland Crane & Engineering Co., Wickliffe, Ohio

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BECAUSE of the many ways in which bending presses may be used in the manufacture of all-metal aircraft, these machines have assumed a very important role in this great industry. The bending press does more than its name implies, for it not only bends plate but it may be used for punching, blanking, corrugating, and drawing operations. It is particularly well fitted for the long slim sections used in fuselage and wing construction.

Bending presses may be built for whatever operating speed best suits the job. The most common operating speed is of 20 to 30 strokes per minute, although presses are often built with a two-speed arrangement so as to provide a high and low speed, the lower of which is usually 10 strokes per minute. The low speed is used to avoid reverse bends when working with long sheets. Reverse bends are caused by the whipping of sheets when the work is done too fast. When the machine is used for punching purposes it is possible to operate at a higher speed and often 90 strokes per minute is used.

Only recently have bending presses been used for the multiple punching of rivet holes, although this has been quite common practice abroad for some years. Multiple punching of holes is advantageous because holes can be spaced more accurately, and with punches, operating in close-clearance dies, trouble from burrs and the probability of fracture is eliminated. The machine illustrated, in Fig. 1, is punching 150 holes ranging from 0.078 in. to 0.250 in. in size at one time. Clearance between punch and die is held to 0.0015 in. to avoid burrs. The punches are individually gagged and gaged, with built-in strippers set to accurate scale readings as close as ¾-in. centers. The machine is provided with a special table for supporting the sheets during punching and is provided with a micrometer gage, which is operated by a handle at the front of the machine just below the top of the bed. It should be noted that sheets being punched can be passed through the machine without interference if they are not longer than the distance between frame and housings. The gage in this instance will give spacings between the lines of punched holes within 0.002 in.

For some work it is desirable to punch large holes of 5 in. or more in diameter, and bending presses are very adaptable to such work, as illustrated in Fig. 2. This machine is punching 5-in. diameter holes in 12-gage plate. The same machine is also used for punching holes up to 8 in. in

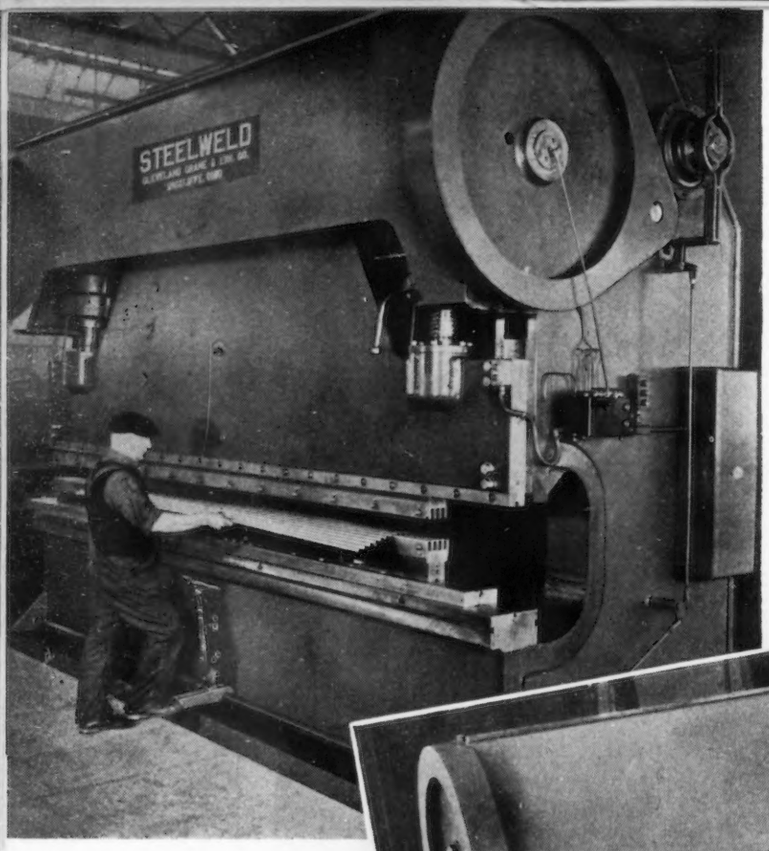


FIG. 3—Corrugations for all metal aircraft are quickly made on this bending press.

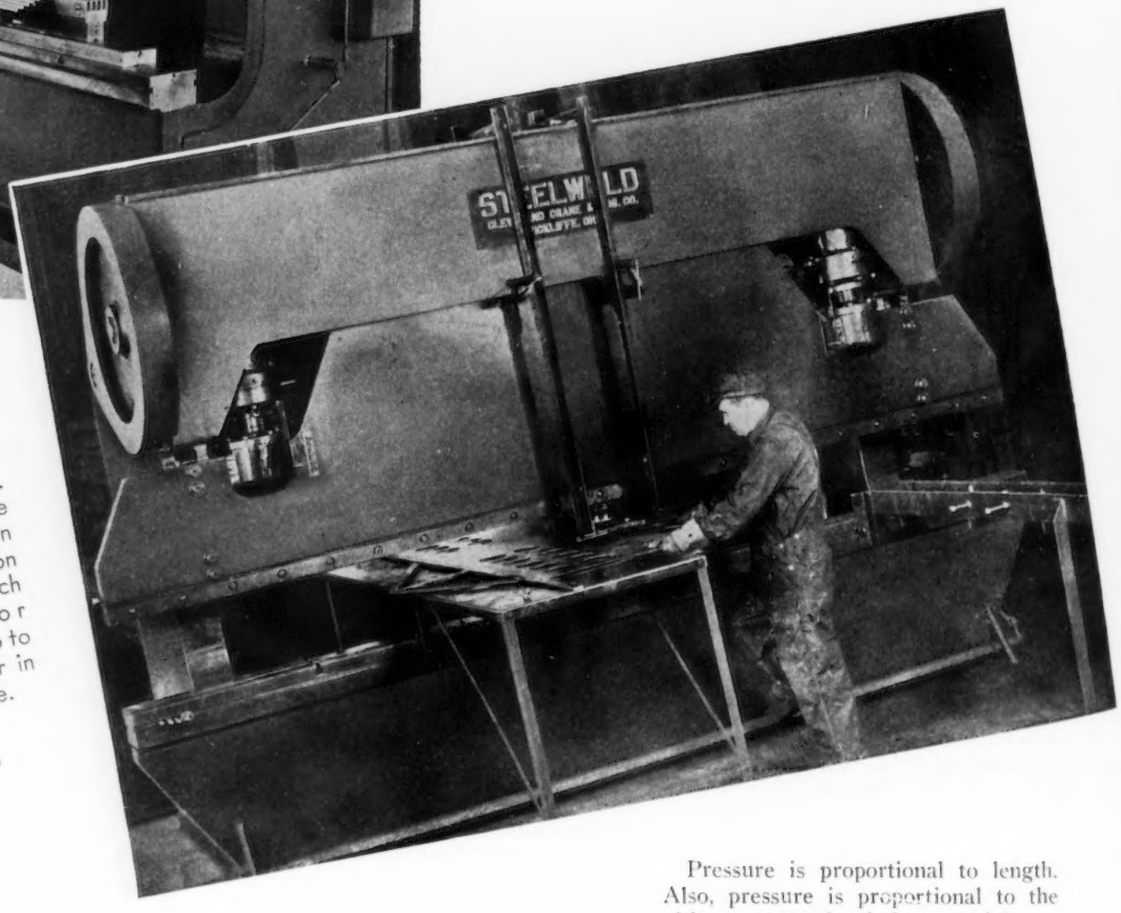


FIG. 2—Holes 5 in. in diameter are being punched in 12-gage plate on this machine, which is also used for punching holes up to 8 in. in diameter in 10-gage plate.

diameter in 10-gage plate. The holes are punched individually.

The tonnage required for punching mild steel (60,000 lb. ultimate strength) is equal to the diameter of the hole times the thickness of the plate times a factor of 80. If the hole is not circular a factor of one-third the total length of the outline of the hole to be punched should be used. Tonnage required for punching other materials is directly proportional to their ultimate strengths. Tools for multiple punching can be built so that the holes are pierced in series, one after another, instead of all at one time, thereby greatly increasing the punching capacity of any machine.

Of course, the chief purpose of a bending press is to produce straight, accurate bends. This it can do with plates up to 20 ft. and longer. Corrugations are easily and quickly made, as illustrated in Fig. 3. While metal formed and punched in the aircraft industry is of light gage, bending presses are also being used in many structural shops for the forming of heavier metal, thicknesses up to ¾ in., and in some instances short lengths of metal 1 in. and 1¼ in. thick are bent.

A great variety of bends may be performed as shown in the illustrations in Fig. 4. The dies are easily placed in or removed from the machine. They are held by a special clamping device in the ram which automatically alines them and makes a special holding device unnecessary. Gages and indicators provided make it a simple matter to obtain identical results repeatedly with a set of dies.

The accompanying table shows the average pressure per foot of length, in tons, required for bending 60,000 lb. ultimate strength mild steel.

$$\text{Average pressure per foot of length in tons} = \frac{\text{Thickness of plate} \times \text{ultimate strength}}{125 \times \text{die ratio}}$$

Pressure is proportional to length. Also, pressure is proportional to the ultimate strength of the material.

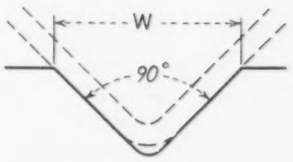
Where shapes to be made have fairly sharp corners or where considerable tonnages are required, or where there is a sufficient number of pieces to warrant the cost, conventional steel dies are used. However, for many bending press operations a single set of one-purpose dies is very costly and to get around this it is possible to combine, in one die set-up, a variety of inserts to keep down the costs. An example of this is in airplane manufacture where there are a great many special channel-shaped sections used. These channels often have a stiffener flange turned over on the end of the leg. With adjustable dies, having removable inserts, it is possible to make a great variety of sizes.

THICKNESS OF PLATE

Ratio of [Die Width "W"] to Plate Thickness	No. 20 U.S. Std. Ga. 0.0375 in.	No. 16 U.S. Std. Ga. 0.0625 in.	No. 12 U.S. Std. Ga. 0.109375 in.	No. 10 U.S. Std. Ga. .140625 in.	3/16 in.	1/4 in.	5/16 in.	3/8 in.	1/2 in.	5/8 in.	3/4 in.	7/8 in.	1 in.
4	4.5	7.5	13.12	16.87	22.5	30	37.5	45	60	....	....	....	..
6	3	5	8.75	11.25	15	20	25	30	40	50	60	....	..
8	2.25	3.75	6.56	8.43	11.25	15	18.75	22.5	30	37.5	45	52.5	60
10	1.8	3	5.25	6.75	9.0	12	15	18	24	30	36	42	48
12	1.5	2.5	4.37	5.62	7.5	10	12.5	15	20	25	30	35	40
16	1.12	1.87	3.28	4.21	5.62	7.5	9.37	11.25	15	18.75	22.5	26.25	30

To assure operators not overloading their machines, modern machines are provided with a tonnage indicator. Such a device keeps both the operator and the management informed at all times of the loadings to which the press is being subjected. A very late type of indicator has two pointers. The "job" pointer, which registers the tonnage for the individual job being worked in the press and the "maximum load" pointer which indicates the maximum load at which the press has ever been operated. The job pointer remains at the highest tonnage reading developed by any of the operations of the job, and may be reset to zero reading at any time. Once set the indicator requires no further adjustment.

Just as many of the earlier difficulties of airplane construction have been overcome; so have they in the construction of modern present-day bending presses. Deflection has been reduced to a point that now it can be guaranteed not to run over 0.001 in. per ft. of distance between housings. A great deal of this is due to all-welded steel construction, which ties all parts



of a bending press frame together into a rigid and actually one-piece unit with all possibility of slippage from rivets and bolted connections eliminated.

The most vulnerable part of any bending press frame is the throat section. This used to be a common place of breakage and formerly gave rise to considerable trouble. The all-welded steel construction has eliminated this and ever since this type of construction has been adopted difficulties here have been completely wiped out. This is quite understandable when it is realized how easy it is to strengthen a section by means of welding. In this case, heavy steel forgings, welded into the throat, plus box-type end housings and heavy reinforcing bars radiating from the throat provide as much strength in the throat section as in any other part of the frame. Because of this throat construction, very deep throats are obtainable. With Steelweld presses, 18 in. is standard throat depth for the entire line. This dimension may be increased up to 36 in. for some models if desired. As throat depth is a factor in determining the frame size, it can be made only as deep as shipping limitations will allow. The advantage of a deep throat is the unusual bending possibilities which it permits. With an 18-in. throat bends up to 18 in. from the edge of the plate may be made for the full length of the machine.

The many ways in which bending presses may be used have been developed only in recent years and undoubtedly there will be found a great many other purposes for and ways in which to use these versatile machines.

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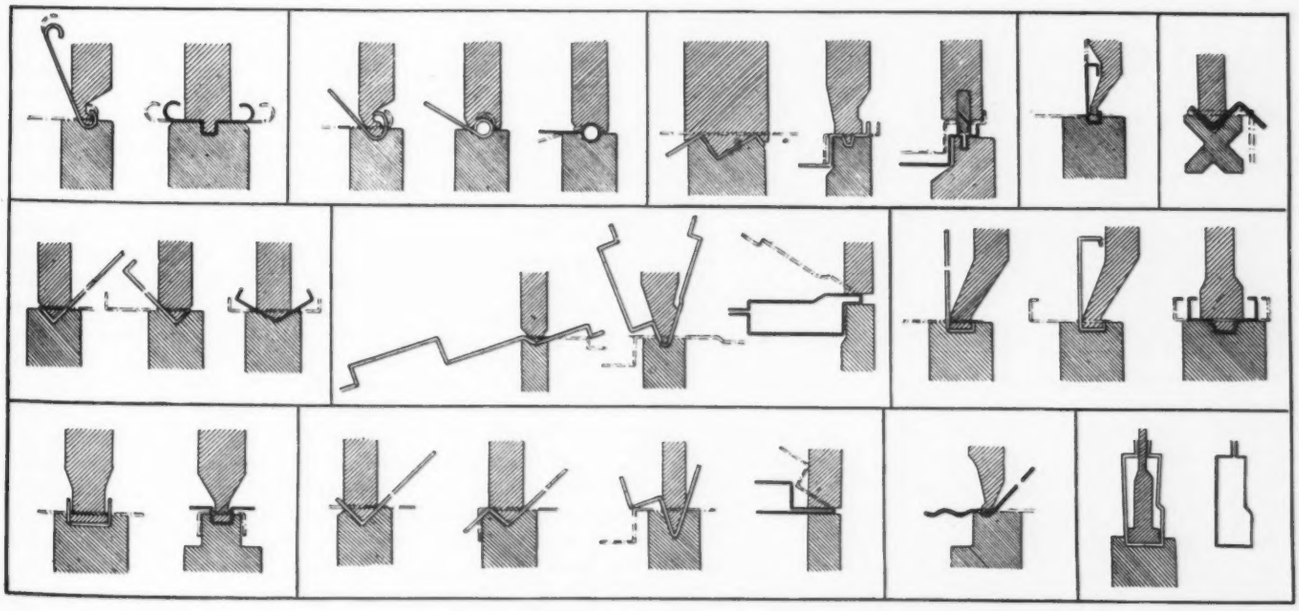
FIG. 4—Some of the types of bends which may be performed on bending presses.



Material

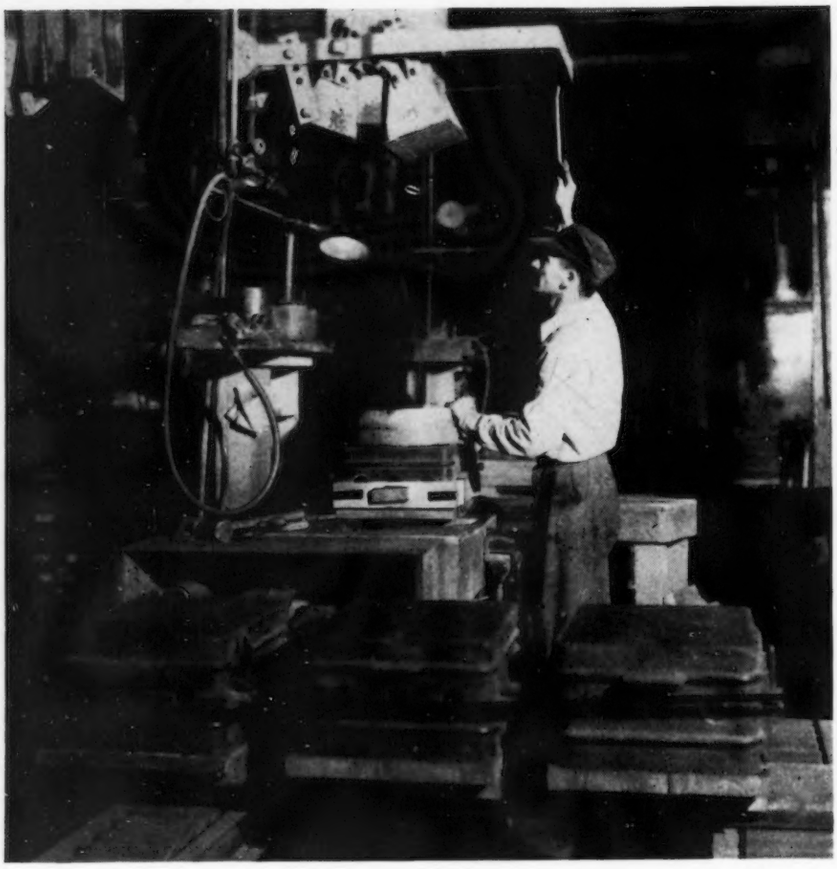


FIG. 1—In the non-ferrous foundry sand is drawn from an overhead bin directly into the flask.

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IN a plant such as the Philadelphia works of General Electric Co., making a large number of different but related products, there is bound to be some very perplexing material handling problems. As in most of the General Electric Co. plants, however, material handling has been given very specialized study with the result that without exception material flow is easily traced through the various operations, the solution being generally the closest distance between two points, raw material and finished product.

Before going into a detailed study of material handling here it will be well to understand that this plant has completely changed from the older method of centralized production storerooms and centralized assembling department to a de-centralized assembling plant with storage space allocated in each assembly room for the materials used in the assembly. There are, however, some centralized portions of the plant wherein material handling methods apply to entire plant operations regardless of product and these will receive first consideration.

Parts cast of non-ferrous metals are produced in a modern foundry fully equipped with sand handling and reconditioning system, mold conveyors, shake-out, flask conveyors and overhead trolley system for handling the metal to the pouring position. In Fig. 1 is shown one of the molding positions. Boots extend downward from the sand bin overhead and the flask is supplied with sand by opening a valve directly over the molding position.

The mold, when finished, is placed on a roller conveyor and brought to the pouring position. The metal is brought from the melting furnace in lined ladles operating on an overhead trolley and the mold is poured. The mold then goes to the dumping position, there being sufficient cooling space allowed between the pouring and the shake-out. Fig. 2 shows the mold being turned over on the shake-out grate where the casting is separated from the sand. The sand is screened by the shake-out screen and passes downward to a conveyor boot of the bucket elevator. The sand is elevated to the upper level where it passes over a magnetic pulley, is mixed in a sand mixer and then goes by way of a belt conveyor to the mixed sand bin.

Another series of handling jobs common to general factory operations is found in connection with the disposal of scrap. Five different kinds of non-ferrous scrap metal are handled. This material may be in the form of skeletons, punchings or borings. The value of this scrap depends to a considerable degree on its freedom from contaminating materials and therefore considerable care must be exercised in placing it in containers and storing it separately until enough has been accumulated to warrant shipment. Over 200 metal containers, such as shown in the pile in Fig. 3 have been provided. Each box is provided with channel legs and crane chain ears. A fork lift truck is provided for the handling of these loads. Each box holds approximately 2000 lb. of borings and by means of the lift truck they may be stacked three high as shown.

An outstanding feature of this method of handling scrap by means of the fork lift truck is the ease with which the material can be loaded into cars for shipment, a carload of 32,000 lb. being loaded in 2 hr. by one man and the lift truck. The box having been picked up by the lift truck is elevated and the special dumping bar is swung forward until the pin in the lower end of the bar engages the hole in the leg of the box. These dumping bars, one on each side of the lift truck standard, are capable of being moved in and out by the operator to engage the box leg. The forward end of the box is provided with an automatic door which opens as the load shifts downward against it due to the use of an off-set hinge having its pivotal point about 12 in. back of the forward edge of the box. The dumping

Handling at GE . . .

By C. C. HERMANN
Mechanical Engineer, Philadelphia

operation is easily accomplished by merely lowering the fork of the lift truck as shown in the illustration. The load being lifted high permits dumping in a high pile thereby avoiding further handling of the material.

Machines for turning cast and bar stock parts are located in the respective division responsible for the assembly. This is in line with the established practice of de-centralization of production. Therefore, machine turnings, borings, skeleton scrap and bar ends are produced in various parts of the plant and must be picked up and conveyed to the scrap dock. For this purpose large boxes have been constructed 48 in. high, 54 in. wide and 96 in. long with wheels under the four corners. One of these boxes is shown in Fig. 4 loaded with tangled turnings. It is being carried on a lift truck. However, they may also be carried by the motor truck shown in Fig. 5 when desired. For the latter service the box is elevated by being placed on a special platform which permits the truck to be backed beneath it for picking up the load. In Fig. 4 the load is being conveyed to a crane for dumping on the yard pile.

Still another type of handling involves yard waste which must go to the incinerator or dump. For this type of handling, metal containers on high legs as shown in Fig. 5 are used. All kinds of scrap material are loaded into these boxes and if the material is combustible it is hauled direct to the incinerator. Here it is dumped into the pit which is directly in front of the incinerator thus avoiding further handling except to the fire box.

In all these methods it is to be noted that one-man operation is a rule. In the case of the lift truck one man performs all operations without leaving the truck platform. In the case of the auto-truck the man must leave the driver seat to insert the round bar which holds the load on the truck platform but otherwise the entire operation of lifting, lowering and dumping is performed from the driver seat. The operations shown are but a few of the many uses to which this type of equipment may be applied and is applied in this plant.

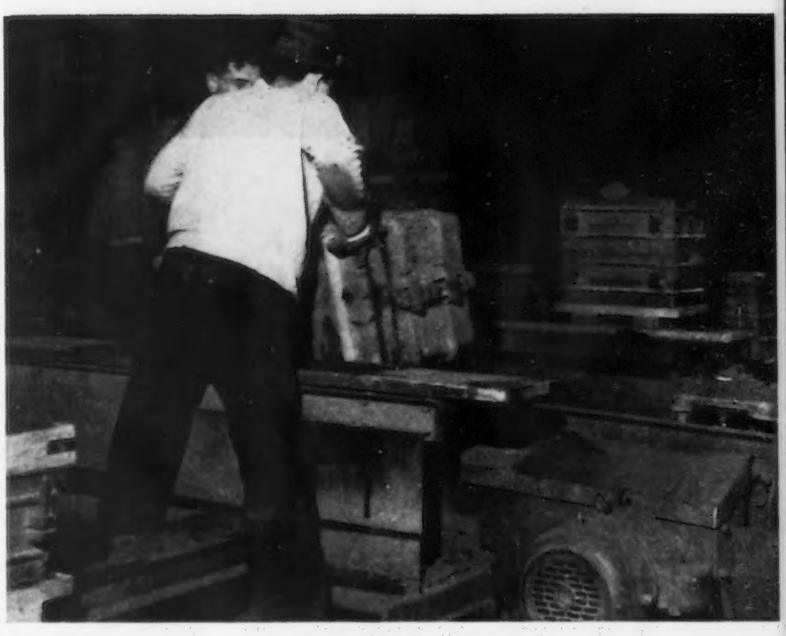


FIG. 2 — The molds are dumped on this shakeout screen and the castings are separated from the sand.

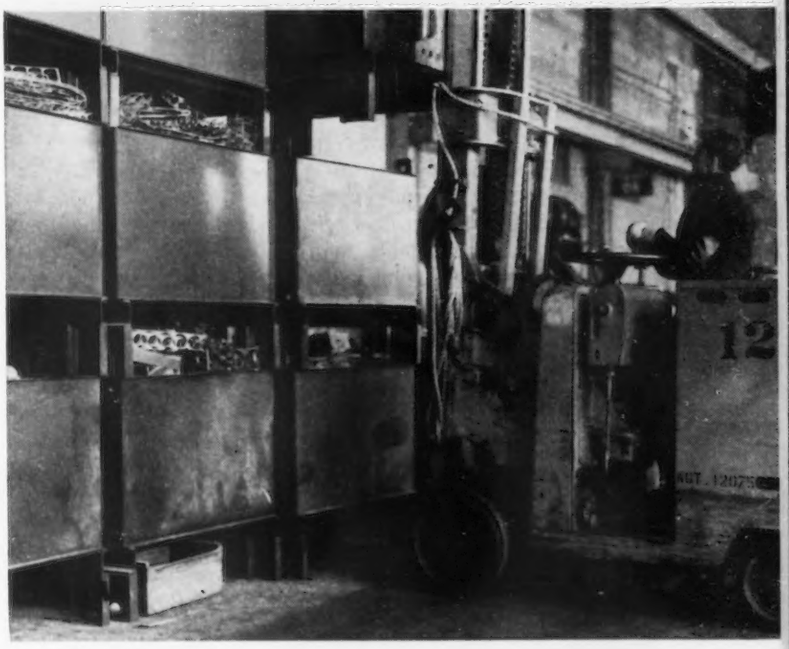


FIG. 3—Boxes of non - ferrous scrap are stacked by use of the lift truck shown here removing the top box.

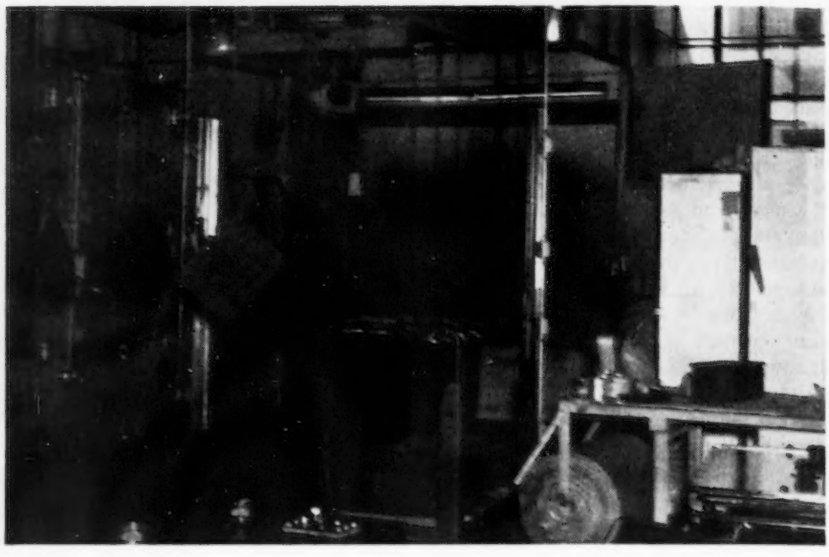
FIG. 4—One of the large boxes equipped with rollers and used in the plant for collecting turnings.

ABOVE

FIG. 5—Here scrap is being carried away by a motor truck having a special chassis.

RIGHT

FIG. 6—A typical conveyor system used for cleaning and spray painting of switch parts.



Another application is found in the shipping of large breakers and switch boards weighing 8 to 10 tons. In this view the fork lift truck is shown raising the end of a large crate so that a pipe roller may be placed beneath same. The truck then shifts around to the opposite end of the crate and the load is moved into the car in short order. Ordinarily these huge crates would require six to eight men for the loading but with the lift truck and two men the job is quickly done.

There being a number of cleaning and painting operations which involve a large number of pieces such as panels, cabinets, cabinet doors, frames, and other parts adaptable to a uniform design of conveying means, for this operation, a standard powered trolley system is used, as shown in Fig. 6. The parts are hung on the trolley hooks by a workman. The parts move through the spray booth, are sprayed and then removed by another workman and placed on a truck for movement to the assembly position. Other parts are placed in tote pans for movement to the final assembly.

As mentioned in the early portion of this article, parts are stored in racks and bins on the assembly floor rather than in central storage rooms as formerly. This plan involves the setting aside of a given floor area and storage space for each assembly or group of assemblies; therefore, when a given assembly is idle the floor area is likewise idle. The experience in this plant, however, indicates that the actual floor space involved by this system over that needed by the central stores system is only the space occupied by the assembly bench.

Corrosion of Aircraft Alloys Reduced

METHODS for reducing corrosion of alloys used in aircraft construction have been developed by the National Bureau of Standards in cooperation with Federal aeronautical agencies and manufacturers.

Corrosion of aluminum alloys was found to be of either the "pitting" or "intercrystalline" types. Methods of heat treatment were developed that eliminate intercrystalline attack, while it was found that pitting can be minimized by manufacturing alloys from high-purity components, and by keeping the copper and iron contents low.

Binary magnesium-aluminum alloys were found to become more susceptible to corrosion as the aluminum content increased, but small additions of zinc or tin rendered these alloys more resistant to attack. Stainless steels of the 18 chromium-8 nickel type, containing small additions of molybdenum, were more corrosion-resistant than similar alloys without addition elements, or those with small additions of titanium or columbium.

The Standards Bureau has succeeded in developing surface coatings for both aluminum and magnesium alloys which markedly improve their resistance to corrosion under severe exposures to salt air. Corrosion is affected by riveted joints, gas welds, seam welds, and spot welds. Important data have also been obtained on the potential effects involved when alloys of different chemical compositions are exposed to corrosion in contact with each other.

What's New in Press Brakes and Presses

By FRANK J. OLIVER
Associate Editor, The Iron Age

STANDARD and special types of press brakes have been placed on the market in recent months, and a number of hydraulic presses for special applications have been introduced. Among related types of sheet metal equipment described in this periodical review are an improved sheet leveler, sheet metal gager and a machine for fastening lock nuts in sheet metal parts. Related only in general design features to presses is a new double action drop forging hammer described at the end of the article.

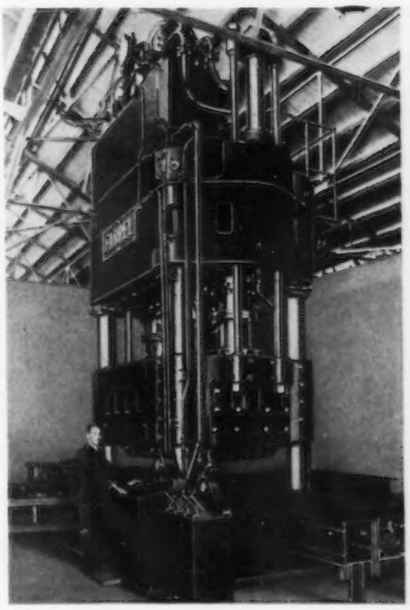
A SERIES of Steelweld bending presses adaptable for extensions of bed and ram at one or both ends has been announced by the *Steelweld Machinery Division* of the *Cleveland Crane & Engineering Co.*, Wickliffe, Ohio. Illustrated is a model H-8 press, provided with 2-ft. extensions on each end. This press normally handles plates 8 ft. by 5/16 in. between housings, but the extensions make possible the forming of plate 14 ft. by No. 12 gage. Other Steelweld presses developed in this series will handle plates up to 20 ft. and thicknesses up to ¾ in. The frames are of one piece all welded construction. All gearing is inclosed, and shafting and drive are located at the rear of the machine, thus preventing damage from bent-up plates, etc. Two forged steel eccentrics, one on each end of the machine, operate the ram. Eccentric bearings are automatically lubricated by two oiling units mounted on either end of the machine. Main drive is of the multiple disk clutch type.

Bending, forming, blanking, drawing and multiple punching may be performed on presses of this type.

Hydraulic Forming Press

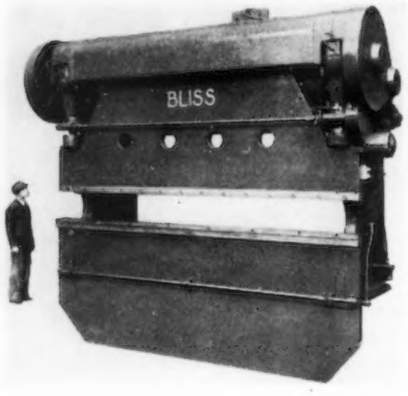
ILLUSTRATED is one of several 2200-ton hydraulic presses recently built by the *Farrel-Birmingham Co., Inc.*, Ansonia, Conn., for the blanking and forming of dural sheet metal parts for airplanes. A feature is the conveyor tables located on four sides of the press for loading and unloading it to keep the press operating at maximum output. These tables are equipped with a movable platen on which dies are mounted and carried into and out of the press. Movement of the platens is controlled from an auxiliary control desk alongside the main press control desk. Provision is made to register each platen uniformly on the press bolster.

The presses are designed with a maximum opening of 60 in. and maximum stroke of 36 in. Overall dimensions of the bottom crosshead and of the moving platen are 96 x 133 in., while the clear space between tie rods is 61 x 97 in. The hydraulic pump is the radial piston type, with variable pressure control up to 2500 lb. per sq. in., and is driven by a 150-hp. squirrel cage motor. Platen closing speed is from 1 to 130 in. per min., pressing speed from 1 to 12 in. per min. Hydraulic pressure is applied through one 38-in. diameter ram and two 20-in. rams, with two 10-in. rams used for pull back.



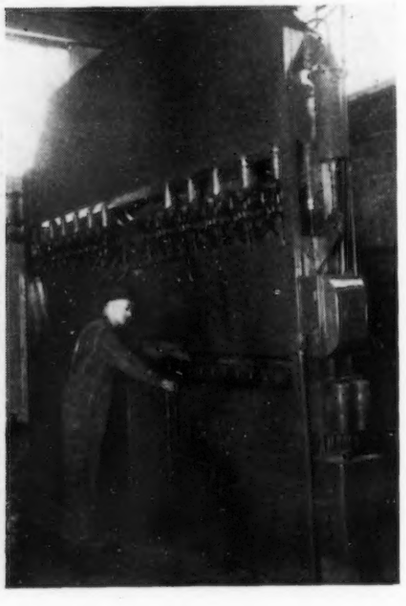
Steel Press Brake

LATEST addition to the line of all steel press brakes made by the *E. W. Bliss Co.*, Brooklyn, is the No. E-12 illustrated. It has a capacity of 12 ft. by ¼ in. in mild steel. Bed and slide have been proportioned so as to keep deflections to a minimum. Drive is by V-belt through an electrically operated friction clutch. Intermediate gearing is lubricated by oil or grease in oil-tight housings, while partially open guards retain the lubricant for the larger gears. Bronze bushings are provided for eccentric shaft and intermediate shaft bearings. Stroke of slide is 3 in., motor adjustment of slide 6 in., and depth of gap 12 in.



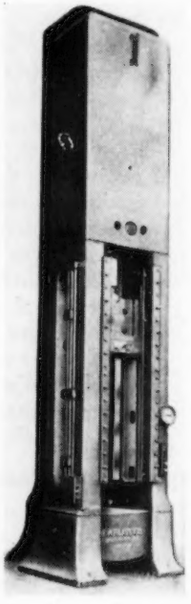
Dual Power Press Brake

AN unusual feature of the press brake fabricated by *Charles J. Griswold* of Lockport, N. Y., is that it has two separate power systems. For forming operations on light gage sheet metal, where the pressure requirement is up to 7000 lb., compressed air furnishes the power. On the heavier work hydraulic pressure up to a total of 250 tons is applied by 10 jacks operated by connecting rods working in multiple from one 15-hp. motor. Another feature of the machine is an adjustable die which makes it unnecessary to change dies when the contour or angle of bend is changed. The press is 14 ft. long, has a stroke of 9½ in. and will form ¼-in. plate to an angle of 30 deg. The steel shapes and plates from which the press was built were all flame cut and the assembly was entirely by arc welding, Airco Nos. 78 and 87 electrodes being used.



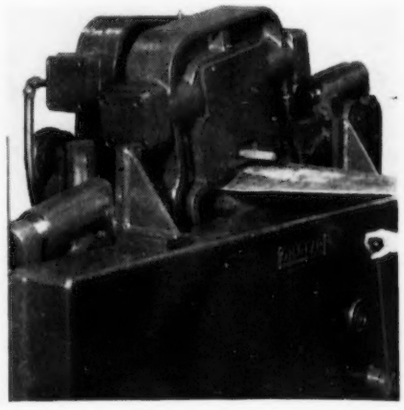
Press for Cartridge Cases

THE 100-ton, 84-in. stroke hydraulic press illustrated is the latest Hydro-Dynamic press built by the *E. W. Bliss Co.*, Brooklyn, for redrawing cartridge cases. Press is of rigid tie rod construction, with keyed sections of high test cast iron. All electric control and a fast acting valve system are featured. Transitions from rapid advance to high pressure working stroke are effected by three stops shown on the near side of the machine and adjusted by hand crank at the front. Pressure switches are furnished to avoid injury to the dies from overload. Push button control permits safe die setting operations, with increments of 1/32 in. readily obtainable. Area of the bed is 30 x 31 in.



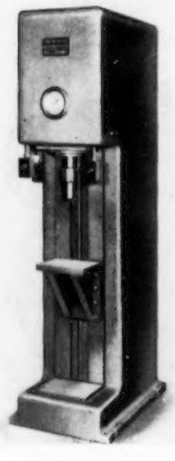
Hydraulic Propeller Twister

A HIGHLY special machine incorporating fluid power and variable speed has been built by the *Oilgear Co.*, 1314A Bruce Street, Milwaukee, for rectifying the pitch of aircraft propeller blades so as to minimize subsequent machining operations and hold forging tolerances to a minimum. The machine will twist the blade in either direction and maintain the axis of twist on the longitudinal centerline of the work piece. The propeller blade is threaded through a stationary clamp and a twister clamp to the point to be twisted. Through push button actuation, clamping is then effected hydraulically, and twisting is effected by rotation of the twister clamp by means of a pair of hydraulic cylinders. This movement is controlled by a directional follow-up lever. Pressure on the two clamps increases proportionately to the pressure required to twist the propeller. Normal torque is 530,000 in.-lb. The center distance between the stationary and twisting supports can be varied from 7 to 10 in.



Knee Type Hydraulic Press

ESPECIALLY designed to facilitate rapid change of tools and fixtures on short run work is the type DLKC2 knee type hydraulic press for assembling, straightening and other general production pressing, made by the *Denison Engineering Co.*, Columbus, Ohio. Standard bolsters may be furnished at any convenient vertical location, and screw type bolster supports are also available. The press is furnished in 5 and 15-ton capacities, with corresponding down ram speeds of 30 and 19 ft. per min. Pumps used are constant volume, van type, mounted with the motor in the column just above the oil reservoir. Frame is of electric welded steel construction. Control of the press is either by dual push buttons as shown, or by hand lever.



Hydraulic Punching Units

NEW types of individual hydraulic punching units are used in the set-up shown which was designed specifically for punching 16 holes simultaneously in a ⅛-in. steel disk. Mounting of the units on the steel base is such, however, as to permit rearrangement for other work. Speeding up of the operation is obtained by using constant air pressure in the piston return chamber. During the punching stroke, this air pressure is overcome by hydraulic pressure obtained from a pump and actuated by a three-way control valve. Additional time is saved by means of automatic work locators attached to the spring stripping plates which hold the part firmly in place during punching, thus dispensing with any manually operated

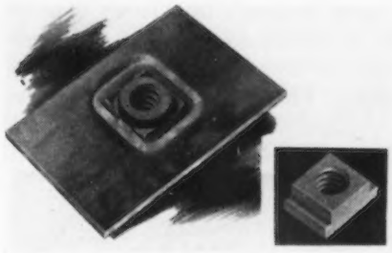
holddown clamps. Ejection of the work is by treadle. These punching units are made by *Progressive Welder Co.*, 3017 E. Outer Drive, Detroit.

Sheet Leveler

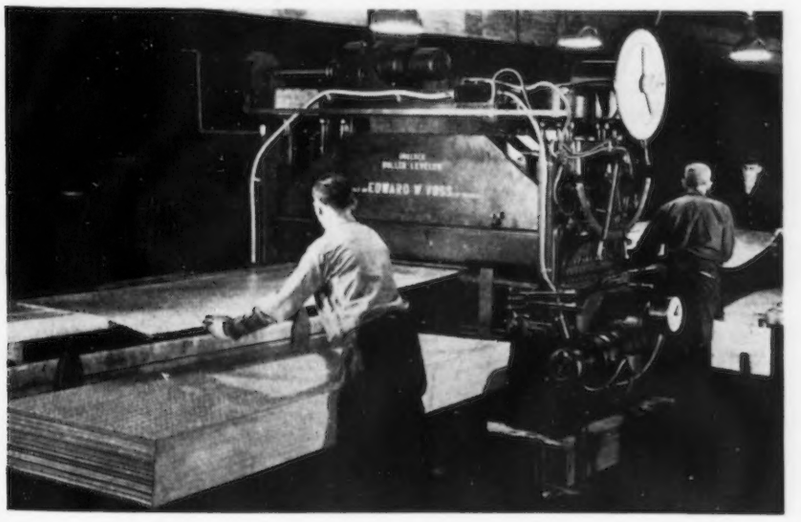
CONSIDERABLE increase in operating speed is featured in recent installations of Ungerer roller levelers made by *Edward W. Voss*, 2882 W. Liberty Avenue, Dormont, Pittsburgh. Characteristic of other Voss levelers, these latest machines employ a multiplicity of narrow backup rollers, a system that prevents the leveling rolls from deflecting in operation and at the same time is used to flex the bottom leveling rolls for localized flattening of the material. Distribution of support over the entire length of the leveling rolls, the manufacturer claims, eliminates the tendency of small size rolls to whip at high operating speeds or to bend under leveling pressure. Other new construction details include the location of the screw-down control motor on top of the frame, in place of a gear case suspension type mounting. An improved lubricating system for the leveling roll necks has also been adopted.

Sheet Metal Nuts

DESIGNED originally for automobile body work, Fast-On lock nuts provide a new method of increasing the thread area in sheet metal,



making practical the use of lighter gage metals and simplifying assembly in inaccessible places. Punched out of a drawn flanged section, the small, square portion of the nut is inserted in a square hole cut in the metal and protrudes just enough for the four corners to be clinched with a swaging tool. The thread runs to the very edge of the nut. Because of its shape the nut can be entered into the sheet metal either way and it is easy to handle in attaching machines. Thirty-three kinds of Fast-On nuts are available in Nos. 6, 8, 10 and 12 screw sizes and ¼, 5/16 and ⅜ in. sizes and various thread pitch diameters. These nuts are supplied by *FabriSteel Products, Inc.*, Kerr Machinery Building, Detroit.



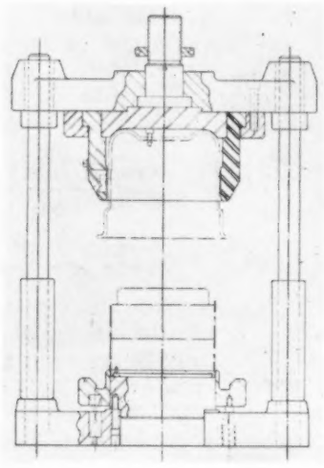
Lock Nuts Fastening Machine

A SPECIAL streamlined machine has been designed by *FabriSteel Products, Inc.*, for the setting of Fast-On lock nuts where large scale production is required. The nuts are fed from a continuous rotating hopper (capacity 1000 ¼-in. nuts) to an anvil, where the clutch is tripped and the nut is locked in place. It is reported that 2500 Fast-On lock nuts can be set per hour. Factors making practical such a high rate of production are: Non-repeating clutch, with crank locked in dead center position; and a narrow anvil and a square-cornered nut, which makes locating easy. Length from floor to work may be adjusted from 34 to 39 in. Safety anvil eliminates the possibility of overloading the machine or stalling the motor. This same hopper assembly may be adapted to a punch press.

Assembling Fixture

AN interesting fixture for press fit assembling of precision parts is in use at the plant of a manufacturer of electric refrigerators. The fixture, which is mounted on a 10-ton *Colonial* utility broaching press, is used for pressing motor housings over the motor stators. The latter is loaded in the lower half of the fixture and is

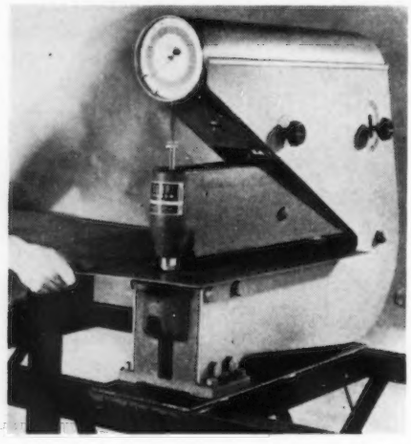
located angularly by means of a pin. The housing is slipped into the top of the fixture which is attached to the hydraulic ram. The housing is retained by a simple leaf spring bearing against a plug in the housing, shown at the left in the cross-sectional view. When the ram descends and



contacts the locating collar in the lower fixture, it pushes the collar down against spring pressure to complete the assembly. Retraction of the ram is automatic. The weight of the assembly releases it from the upper fixture, while the collar in the lower fixture raises the assembly off the locating pin. The operation is extremely fast and requires a minimum of manual effort.

Sheet Metal Gager

INSPECTION costs for determining off-gage sheets can be reduced to a minimum with the Guyer gager, made by the *Streeter-Amet Co.*, 4101 Ravenswood Avenue, Chicago. With this mechanical micrometer, from 8 to



38 gage readings per min. can be made with the standard machine. In operation, the device clamps a sheet at any point long enough for the operator to read the large dial, which is graduated in thousandths, and then automatically releases the sheet. The cycle frequency of clamping, gaging and releasing may be varied, and by following the rhythm of the cycle, the operator can shift the sheet from point to point rapidly, obtaining readings in a fraction of the time required for hand "miking." The throat of the machine is 23 in. deep clear of the measuring anvil. Adjustable dial rim markers can be set to represent gage limits for metal forming, drawing and stamping operations. A table, with leaves of maple, can be furnished to facilitate handling of sheets. Clamping is effected by a 1/18-hp. split-phase induction motor with rheostat control.

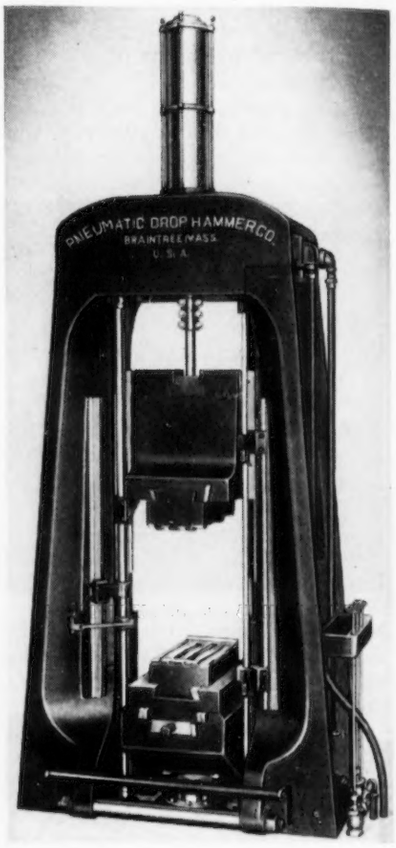
Hydraulic Valves

ONLY one-eight turn of the operating handle is required to open and close the Hydra valve made by the *Albright Equipment Co.*, 921 Crafts Building, Pittsburgh, for use in hydraulic presses and machinery and for descaling operations in steel mills. They may be used on water,

steam and oil lines, at pressures up to 4000 lb. per sq. in. When the handle is closed, four stainless steel balls are automatically engaged in port holes due to pressure on the line. There are no valve seats to regrind. Internal parts are stainless steel, but valve bodies may be had in brass, bronze and steel. Standard sizes include ½, ¾, 1, 1¼, 1½ and 2 in. diameters. Operation may be by hand or by solenoids with push button control.

Double Action Drop Hammer

FREEDOM from shock and vibration and elimination of a heavy anvil and massive foundation ordinarily required for drop hammers are claimed for a new double action drop forging hammer, developed by the *Pneumatic Drop Hammer Co.*, Braintree, Mass. By proper arrangement and control, the opposing heads meet



each other with the same impact force, causing them to stop without shock or vibration to their supporting members. The dropping head is lifted by air and dropped by gravity and at the proper time in its descent releases the anvil head which is propelled upward to meet the former. The motions of the two heads are reversed at impact and returned to operating position. Stroke adjustment is readily made. A foot treadle controls all movements of the hammer. Rigid parallel guiding members assure perfect register at impact, and adjustable gibs are used to compensate for wear. The No. 2 size illustrated develops 6000 ft.-lb. at impact.

SPEED!

REVERE DIE PRESSED OR HAMMERED FORGINGS OFFER YOU THESE ADVANTAGES:

TWICE WROUGHT—Revere Forgings are wrought from extruded metal, doubly insuring the elimination of imperfections, and imparting the greatest possible density through the additional working the metal receives in process of extrusion followed by forging, both processes "working" the metal under tremendous pressure.

LESS WEIGHT—The great strength and non-porosity of Revere Forgings often permit reduction of weight of parts previously produced by other processes. Metal saved by this method may pay the cost of applying additional finishes, if desired, which otherwise could not be afforded.

FEWER OPERATIONS—and a shorter time per operation are required; in fact, one or two operations may often be eliminated because of the accuracy and smooth surface of Revere Forgings.

FASTER MACHINING—Revere Forgings may be machined with maximum speed, owing to their free-turning qualities and absence of grit and chilled areas, common in sand castings, which retard the machining speed, dull the cutting tools, increase scrap waste and necessitate rejections. Considerable reductions in machining costs are the rule.

SCRAP LOSS—Scrap is made in minimum quantities because of the close and uniform tolerances to which Revere Forgings can be held.

Given time, American Industry unquestionably can produce all America needs for national security. The question is *how soon* can the tremendous quantities needed be actually ready.

Any time saved now in any manufacturing process automatically helps to speed up our whole industrial program.

Long before the present emergency, designers and production executives found they could save time (and often cut down over-all costs) by the use of Revere Forgings instead of sand castings in products using irregularly shaped copper or copper alloy parts.

• • •

When required, Revere Forgings can be supplied completely finished and ready for use.

Also, Revere Industrial Extruded Shapes, and many other Revere Products, offer you considerable opportunities for speeding up your production.

The Revere Technical Advisory Service is ready to call at your request to cooperate with you in any copper or copper alloy problem. Simply write us and ask for this free, non-obligating service.

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On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Educational orders have done little more than acquaint Detroit manufacturers with some of the production problems . . . Michigan to train 10,000 workers in eight weeks . . . Murray and Briggs to engage in airplane parts manufacture

DETROIT — Whatever recasting of the nation's industrial mobilization plan may have been found necessary in the light of blitzkrieg developments, panzer corps activity and stuka dive bombers, it is assumed that the proper authorities are taking care of the matter. But meanwhile, industry itself has formulated some opinions about the effectiveness and the amount and kind of preparedness which the educational orders are fostering.

First of all, it has been generally assumed (not necessarily by Army officials or by the specific industries involved) that educational orders amounted to "initial production runs" on the products named in the orders. In other words, industrial mobilization was supposed to be given a sort of test run in plants and factories by means of the small-scale production authorized in the educational orders.

Second, it is a general assumption that in fulfilling an educational order plants tool themselves so they are ready to go ahead on military production immediately upon receiving notice to do so. It is the assumption that mass production calls for merely the expansion and extension of the set-up established while carrying out the educational order.

Most of the educational orders placed so far appear to be still in the process of tooling and production planning, but enough have been carried out to completion, or near-completion, to reveal some of the fallacies in the two assumptions stated above.

It now appears to be the opinion in industry that the main function of the educational orders will be to acquaint industry with the problems it must face, rather than to provide the answers to the problems here and now.

Have Not Yet Licked Problems

THIS opinion is summed up by one production man who says, "our work so far has served mainly to show us the problems we would encounter if we went into mass production on this item. From the knowledge gained in this job-lot production (under existing educational orders) we will be better able to tool up for a satisfactory production job, if required. But we have not actually licked all the problems; we have merely got close enough to the product to foresee some of the problems.

"The tooling that we have now is predicated upon small-lot production requirements and probably would be scrapped in favor of new tooling if an order for full-out production were given on these military products," he added.

Meanwhile, the first special classes to train men for jobs in national defense production were started at Detroit last week at Cass Technical Highschool. More than 1600 Detroit men were enrolled, and 70 instructors were in charge of the classes. In Michigan there are plans to train 10,000 men in the next eight weeks. The program probably will be carried through all of the next school year, according to George H. Fern, state director of vocational education. The program, although financed with Federal funds, is being operated under State and local direction and is being carried out in accordance with the needs of each community. Workers are being trained for specific jobs, as required by local plants. The trainees will be given courses to adapt them to work in airplane fabricating plants, foundries, automotive plants, forge shops, munitions plants, radio maintenance and similar subjects.

The Michigan program has the merit of being an extension of normal vocational activities, and is not something entirely new. The State Board of Vocational Education has been training 20,000 to 25,000 men a year for industrial jobs. The most serious lack in the program is equipment. It may be found necessary to use the facilities of plants in addition to the equipment installed in schools. There has already been some investigation of closed or partially closed plants containing equipment that could be used for training programs. About 6000 of the trainees during the summer will be in Detroit and the rest will be scattered in about 30 manufacturing cities and towns in Michigan.

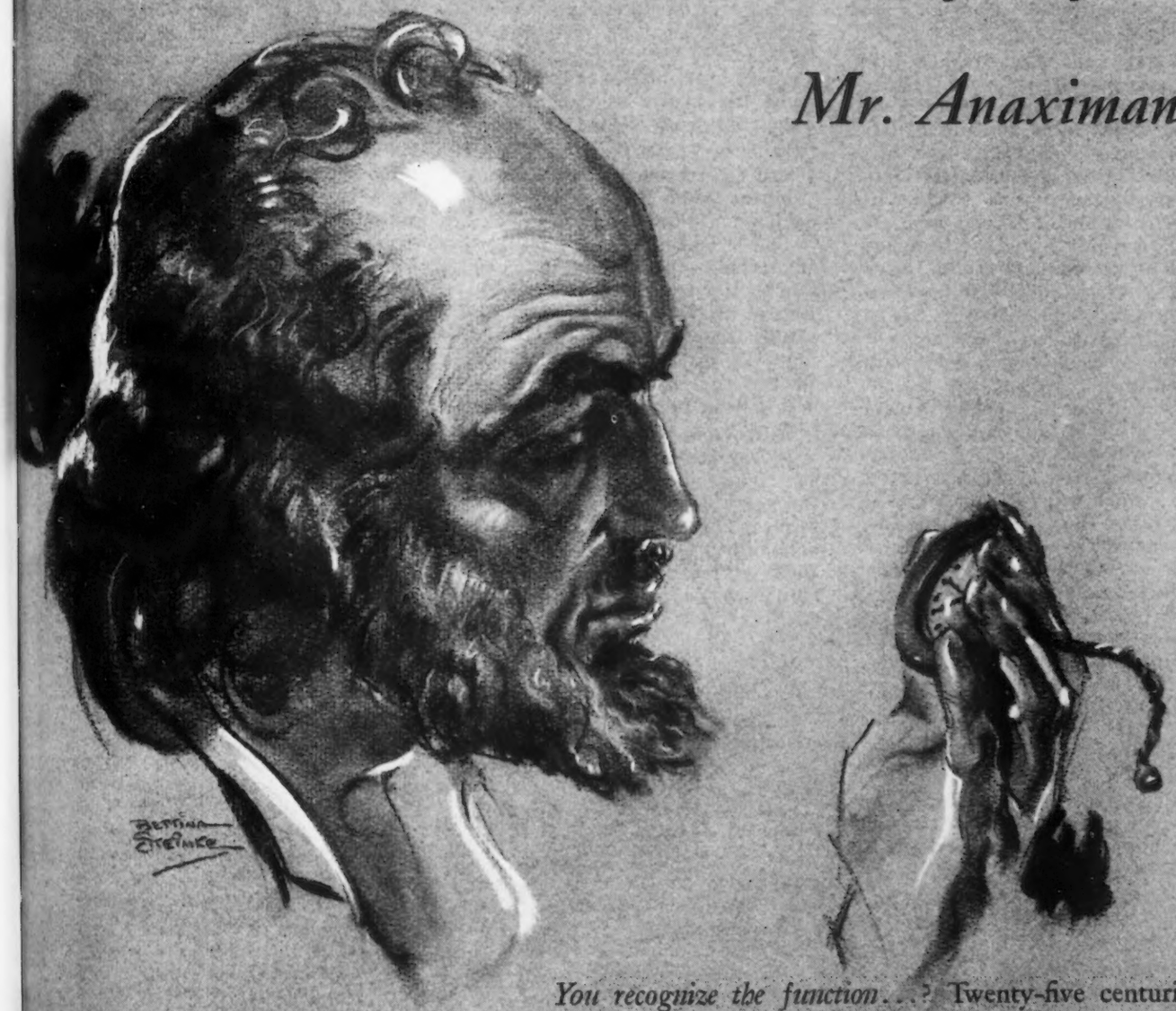
Murray and Briggs in Aircraft Work

MURRAY CORP. OF AMERICA, as well as Briggs Mfg. Co., is making plans to handle subcontract orders from the hard pressed aviation industry. Murray has formed an aircraft division under Richard C. Gazley, for 13 years the chief of the technical development section of the Civil Aeronautics Authority and its predecessor, the Department of Commerce Aeronautics Division. Gazley was graduated in aeronautical engineering from the University of Michigan in 1924. Murray is preparing a wing of its plant for aircraft assembly operations.

Both Briggs and Murray are believed to have most of the equipment necessary to go into aeronautical production, although hand tools such as riveters, some heat treating equipment, jigs, dies and fixtures will be required. Both companies are expected to develop original production methods for airplane parts and

...and it works on a rainy day,

Mr. Anaximander



You recognize the function...? Twenty-five centuries have passed since you introduced the sundial, and even the *watch* is hundreds of years old. But not this one... no, it's a "dollar watch," made by machinery.

It has a high temper steel spring with "train wheels" and shafts and bearings and frame and case and dial and hands... Some of our ladies' models are smaller than your fingernail.

Oh yes, they keep good time. They're well made. The machines that father them maintain a uniformly high standard of accuracy... because these machines are in turn built with the aid of other machines that cut and turn and shape and drill and grind to a degree so fine that their work must be measured in tenths of thousandths of an inch. If we had to make all our watches by hand we'd probably go back to your sundial—and guess the time on rainy days!

IN THE background of modern industry, you will find Pratt & Whitney machine tools, small tools and gages. Through accuracy, Pratt & Whitney keyword since 1860, production costs are lowered... new products are developed... new industries arise... new jobs are created. Pratt & Whitney accuracy makes rare luxuries common. Man moves to ever-improving comfort, economy, convenience, health, safety... across the background of Pratt & Whitney accuracy.

Accuracy

PRATT & WHITNEY

Division Niles-Bement-Pond Co. · West Hartford, Conn., U. S. A.

assemblies after the work gets underway.

Entrance of Briggs Mfg. Co. into the aeronautical sub-contracting field for the manufacture of sheet metal parts was announced last week, as predicted in THE IRON AGE of July 11. Briggs has entered into an arrangement with Vought-Sikorski division of United Aircraft Corp. for production of complete metal wing assemblies for Navy planes. An initial release has been received on which deliveries are to start in November. All equipment is expected to be installed by Sept. 1, and about 500 men will be employed. Briggs has set up a separate aircraft division and has taken over part of the operating personnel of Barkley-Grow Aircraft Corp., which was recently acquired by Aviation Corp. Benjamin Jacobson, one of the aircraft industry's pioneers, will be general manager. Jacobson engaged in exhibition flying in 1920 with the late Eddie Stinson, worked with Stinson in building the first Stinson airplane and was general factory manager of the Stinson Aircraft Co. plant from 1925 to 1931. From 1936 to 1940 he was general manager of Barkley-Grow. Also connected with the aircraft division is Gen. W. E. Gillmore (retired) formerly assistant chief of the U. S. Army Air Corps.

The Briggs aircraft plant, having approximately 75,000 ft. of floor space, is situated on a 16-acre site on Conner Avenue on the east side of Detroit. The plant was once owned by Hudson Motor Car Co. and has been used by Briggs for storage recently. A new two-story office building is being erected and the former building is being revamped.

$750,000 Airplane Order

A return to the heyday when Detroit was something of an aviation center is indicated by the receipt of an order by Warner Aircraft Corp. for the output of 250 Super Scarab 165-hp. engines to be installed in Australian training planes. The order totals about $750,000 and calls for delivery of the seven-cylinder radial, aircooled engines to Australia for assembly to planes. According to L. A. Faunce, vice-president of the company, the entire shipment will be completed in the spring of 1941.

Final proposals from the Detroit Board of Commerce for the establishment of a Federal aeronautical engine research laboratory at Wayne County Airport have been submitted to the National Advisory Committee for Aeronautics. The Detroit proposal cited among other things that "the Climax Molybdenum Co. of Michigan has one of the best equipped metallurgical laboratories in the United States."

Word from Washington that the War Department is planning to let contracts for about 1400 tanks in the near future is understood here to mean that it is likely that a sizable order for the production of 25-30-ton tanks will be let to Chrysler Corp. before long.

Record Summer Sales

Retail automobile sales have reached almost tidal wave proportions in recent weeks, climbing in some cases to 100 to 200 per cent above the sales level of last July. Record summer sales were recorded by Buick in the first 10 days of July when sales climbed to 7992 units, 113 per cent above the corresponding period of last July and 19 per cent above the first 10 days of June this year. Packard deliveries were up 225 per cent for the first 10 days of July as compared with the same period last year and were 46 per cent above the first 10 days of June. Pontiac reports a 98 per cent improvement and Chevrolet, in the most moderate report of those received, showed a gain of 50.6 per cent.

An explanation of the late buying bulge this season offered by W. M. Packer, vice-president of distribution for Packard Motor Car Co., is "probably good business has a lot to do with it, but a more likely explanation is that smart purchasers are buying now in anticipation of increased prices."

Prices, as predicted some time ago, have already jumped upward. The reason for the increase at this season of the year is two-fold. First, a half of 1 per cent increase on Federal excise tax became effective on all cars billed to dealers after July 1; second, there have been some increases in manufacturing costs and more are expected, but it is considered prejudicial to good selling to boost the price during a model year, or after new models have been introduced. As things stand now, most manufacturers will be able to say next fall that prices on the new lines of cars are unchanged from late 1940 prices.

Packard has already released a new price list for current (1940) models, showing advances ranging between $4 and $6 on its lower priced cars and up to as high as $14 on its highest priced line. This adjustment reflects the increased Federal taxes. Hudson released a new price list on 1940 models on July 5, although on July 19 the next series of cars (1941) were on display for dealers, distributers and the press. The Hudson boosts range from $10 to $40 and are not attributed officially to the tax increase. Actualy it is known in this case that manufacturing costs advanced during the last year and made an adjustment desirable months ago, but the company took a loss rather than hurt its sales by making a boost in midseason. Other price adjustments in the industry are expected to reflect the same condition.

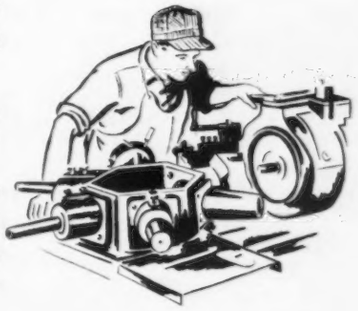
Production 53,020 Cars

Automobile production last week was 53,020 passenger cars and trucks compared with 65,176 (revised) for the previous week and 53,128 for the corresponding week of last year, according to Ward's Automotive Reports. Chevrolet and Ford are still running assembly lines without any interruption and probably will continue to do so for two or three more weeks. They are the mainstays and are largely responsible for the level of last week's output.

NO TROUBLE
To machine *this* Stainless Steel

Its free-cutting qualities have made possible the use of Stainless Steel for thousands of machined parts.

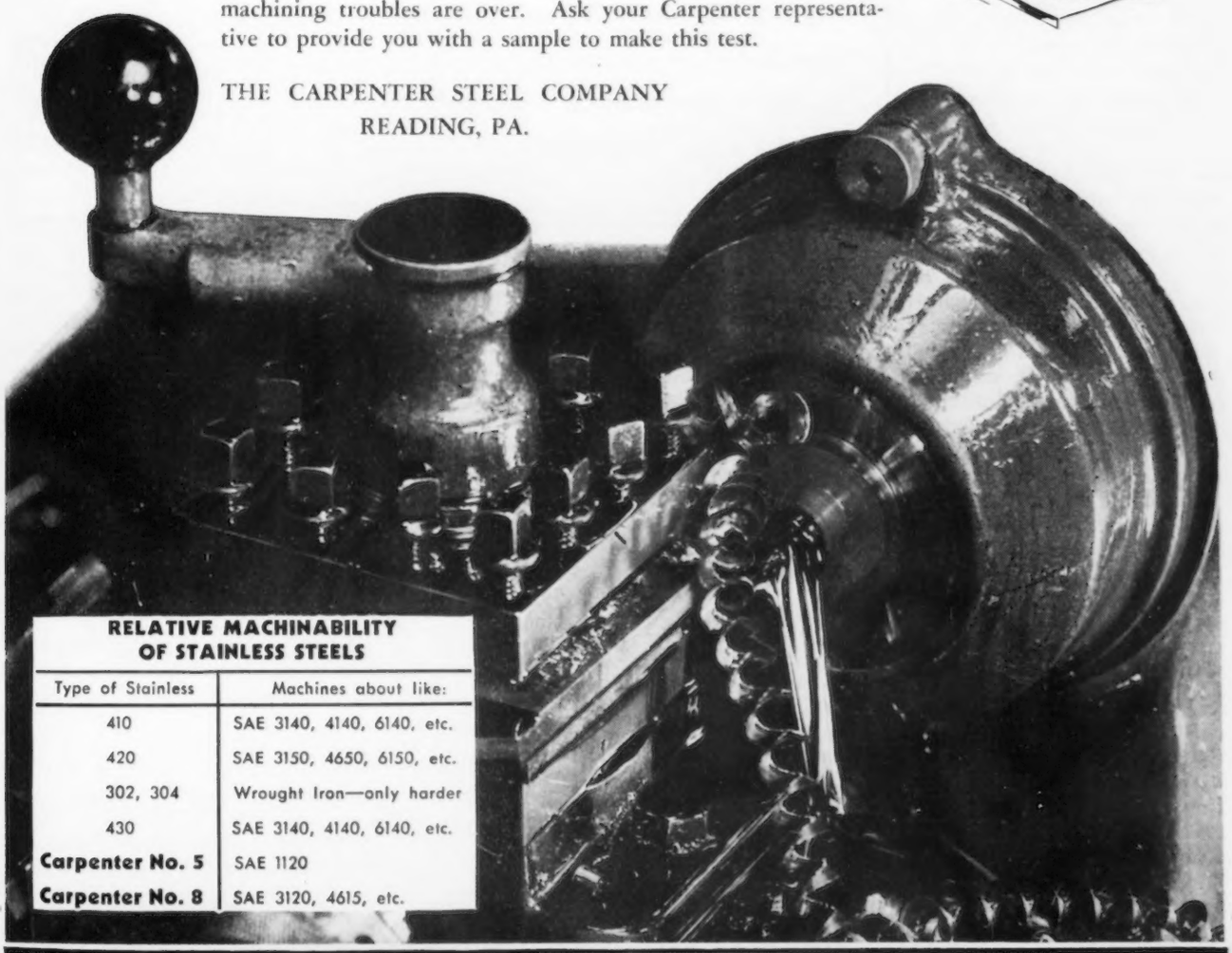
Ever since its invention by Carpenter, Free-Machining Stainless Steel has been reducing machining costs and banishing shop troubles. Jobs that just "couldn't be done," are being done every day with this free-cutting stainless.



You can cut it with regular shop tools at a speed approaching that for ordinary screw stock.

To prove it, try a piece of Carpenter No. 5 *(14% Chrome)*, *or if maximum* corrosion resistance is required, test Carpenter No. 8 *(18-8)*. The way the chips skid off the nose of the tool tells you your stainless machining troubles are over. Ask your Carpenter representative to provide you with a sample to make this test.

THE CARPENTER STEEL COMPANY
READING, PA.



RELATIVE MACHINABILITY OF STAINLESS STEELS

Type of Stainless	Machines about like:
410	SAE 3140, 4140, 6140, etc.
420	SAE 3150, 4650, 6150, etc.
302, 304	Wrought Iron—only harder
430	SAE 3140, 4140, 6140, etc.
Carpenter No. 5	SAE 1120
Carpenter No. 8	SAE 3120, 4615, etc.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington

BY L. W. MOFFETT
Washington Editor

• Defense program continues in embryonic stage . . . Public seen misled about production of war equipment . . . Congress leaden - footed in considering plant amortization legislation and excess profits law

WASHINGTON — Progress reports of the National Defense Advisory Commission disclose the fact that encouraging headway is being made toward assembling the nation's military machine. Nevertheless, the work is only in an embryonic stage. There is a long road to travel before some $15,000,000,000 can be converted into trained men and fighting equipment. The difference between "on order" and "on hand" is vast. Entirely too much ballyhoo, for which the advisory commission is not responsible, has been made about huge defense orders. It smacks of political drivel, designed to mislead the country into a false sense of security. It is given a particularly sinister aspect when viewed in the light of the Presidential campaign now opening blazingly and giving promise of being one of the most bitter in the history of the United States, thanks in large part to the disgusting spectacle of the third-term ambition. This tradition-shattering stroke by President Roosevelt will most definitely prove a distinct setback for "national unity," which he has preached so ardently and is breaching so airily as he gives lip service to democracy and promotes autocracy, about which he rages and against which, it has been supposed, the national defense effort is directed. Talk of unity under this circumstance sounds hollow. In any circumstance, it is going to take time to make and put together all the parts of the extremely complicated defense machine.

Decimation of "Tax-Eaters" May Come

OUTSTANDING essentials to a defense program were set forth in the article in THE IRON AGE of July 18 by Col. H. A. Toulmin, Jr., a graduate from the school of experience in which he made a record of high accomplishment. Hard work and sacrifices, relaxation of politically-dictated restrictions on hours of labor, a decimation in the ranks of tax-eating parasites on the federal payroll, together with demobilization of bureaucracy and red tape are necessary. But there is another bottleneck. Before production can be started the plant must be built or expanded.

"We must begin almost from scratch in our efforts to build up a munitions industry that will provide us with the kind of weapons called for in modern combat," Assistant Secretary of War Louis Johnson has said. "They are highly specialized machines that cannot be developed overnight; and those developed cannot be produced in mass in a day, a week, a month, or even a year.

"Here we have the most stubborn obstacle on our path toward adequate national defense — the factor of time; and time is the one element that we cannot buy at any cost. We are making rapid strides all along our munitions front, but in all frankness and sincerity, I am constrained to report that it will be another year at least before our army's equipment needs can be fully met, and that it will take all of our patience, our ingenuity and our effort to get the job done even in that time."

Yet, in the face of this pressure for time, leaden-footed moves are being made, whereas in one highly important instance at least time could be taken by the forelock looking to new and expanded production. Reference is made to legislation providing plant amortization and tax liability. This necessary development is being held up because private industry is awaiting action. It is not satisfied with mere words or the mere draft of an amortization formula. Neither assures it against loss and possible bankruptcy. The assurance can be given only by effectuating the formula.

A five-year amortization formula has been announced by the White House. It was worked out in collaboration between Administration representatives and representatives of industry, some of them being associated with the National Defense Advisory Commission. While only the outline of the plan has been made known, the principle it establishes has been well received by industry.

The purpose is to do away with profit limitations on national defense contracts and to substitute the formula plus an excess tax law. The ship expediting act, recently passed by Congress, limits to 8 per cent the profits on aircraft and naval orders arising from competitive bidding. Under awards made by negotiation, a plan that has expedited procurement, profits are limited to 7 per cent. Neither form—competitive bidding or negotiated contracts—assures profits. These limitations would be abandoned under the excess profits-amortization program partly because the government thinks they would discourage efficient production and because many sub-contractors, now engaged fully on private contracts, would not be interested in taking government business under the restrictions against earnings while not guaranteeing profits.

Further Delay in Tax Legislation

THE excess profits tax, it is certain, will take care of profits. It will, no doubt, insure against "war millionaires," about which the New Deal affects so much concern. The present plan is to write the amortization formula into the excess profits tax legislation.

What are people saying about this new General Electric Fluorescent Lighting?

Al Ward, furrier, says, "G-E Fluorescent lighting has upped sales. Indoor 'daylight' shows furs in their true outdoor colors!"

Mrs. Carl Davis says, "I love to shop under the new lighting. It makes things look so attractive I just can't resist them!"

Her Husband says, "My office is 200% more cheerful. I do more work in half the time and my secretary makes fewer mistakes!"

Irv Williams, factory foreman, says, "G-E Fluorescent Lighting is here to stay! Production is up and rejects are down!"

Johnny Allen, barber, says, "I see better and feel less tired. Customers don't mind waiting with indoor 'daylight' to read by."

General Electric tells the inside story...

WITHOUT question, Fluorescent is one of the most exciting developments in light since Edison's first lamp.

It is a brand new light source, capable of giving your factory and offices new high levels of cool indoor "daylight" at little or no increase in operating cost. It offers factory management an important new production tool by providing the higher levels of lighting so necessary for faster more accurate seeing and more efficient production.

How you can have it

Naturally, everybody wants to know all about G-E Fluorescent Lighting all at once. "How much does it cost to install?" "To what extent does Fluorescent replace other forms of lighting?" "How soon can I get it?"

Your G-E MAZDA lamp distributor can show you the answer... a full new line of certified fluorescent fixtures, complete with G-E MAZDA F lamps at new reduced prices ...ready to hang up and turn on!

Not a cure-all

Revolutionary as it is, Fluorescent Lighting is no cure-all. If you want to know where and where *not* to use it for best results, ask your G-E lamp man or your electric service company. They can help you give your office, factory, or machine shop 50 foot-candles or more of cool fluorescent "daylight"... using G-E MAZDA F lamps alone or with other types of G-E MAZDA lamps.

Mail coupon today

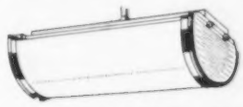
Get the facts. Phone your G-E lamp man or your electric service company...or mail coupon today!

COMPLETE FIXTURES NOW AVAILABLE

The certified fluorescent fixtures shown below are only a few of the many complete fixtures now available through G-E MAZDA lamp distributors.

Commercial unit, 200 watts, using four 40-watt, 48-inch G-E MAZDA F lamps.

Commercial fixture, 100 watts, using two 40-watt, 48-inch G-E MAZDA F lamps.



Commercial unit, 150 watts, using six 20-watt, 24-inch G-E MAZDA F lamps.

Industrial unit, 100 watts, using two 40-watt, 48-inch G-E MAZDA F lamps.

Industrial unit, 75 watts, using two 30-watt, 36-inch G-E MAZDA F lamps.

Industrial unit, 100 watts, using two 40-watt, 48-inch G-E MAZDA F lamps.

This label identifies Fleur-O-Lier fixtures, made by over 35 experienced manufacturers, and certified by Electrical Testing Laboratories as meeting 50 specifications set up by MAZDA lamp manufacturers, when equipped with ballasts and starters certified by E. T. L.

G. E. does not make Fleur-O-Liers but is glad to recommend them.

PRICES REDUCED ON G-E MAZDA LAMPS

On June 1, 1940, General Electric announced sweeping price reductions on Fluorescent and many other types of G-E MAZDA lamps for home and business, including Mercury Vapor and Silvered Bowl MAZDA lamps.

***G-E MAZDA F** lamps are recommended for use only with equipment providing good power factor, such as Fleur-O-Liers, or RLM Industrial Fixtures.*

G-E MAZDA LAMPS
GENERAL ELECTRIC

General Electric Company, Dept. 166-IA-G
Nela Park, Cleveland, Ohio
I am interested in G-E Fluorescent lighting for my office ☐ factory ☐
Name _____
Name of firm _____
Address _____

If this plan is adhered to, private industry will be held up further from building new or expanding present facilities until the excess profits tax legislation is whipped into shape, hearings held, and the bill brought into Congress for debate. This may well require four or five weeks, or even longer.

Because of this situation, suggestions have been projected that the amortization formula be made a separate piece of legislation, and pushed through Congress at once in whatever form would provide the most expeditious action. Apparently the formula faces no serious objection in Congress and therefore there could be no justified complaint that it was being steam rollered into law. To turn to this legislative procedure would remove the cause of delaying in proceeding with needed construction of new or expansion of existing facilities. If it was felt to be desirable to do so, the legislation subsequently could be embodied in the excess profits tax law.

There is no discernible reason why this legislative expediting plan could not be adopted. Congress is merely piddling along, doing nothing important except having political field days since it reconvened after the third-term orgy in Chicago and at 1600 Pennsylvania Avenue, Washington. Just now it is having three-day recesses while it might much better be earning at least a part of the money it draws from the taxpayers, and most members are vastly overpaid. The least it could do would be to push through the amortization plan quickly, necessary as is other legislation such as that to amend the Wagner act and pass the Walter-Logan administrative procedure bill.

Enactment of an amortization formula would be extremely stimulating by way of speeding up large-scale national defense production, and it would give less cause for the recurring complaint that "orders" are one thing and the actual product delivered is quite another thing.

That this is fully realized by Assistant Secretary of War Johnson is indicated by recent remarks he made.

"I realize that an order for a military item and its delivery are two different matters; and I also realize that our citizens are interested primarily in deliveries for such items as guns, tanks and planes," said Mr. Johnson. "Complete deliveries on these, I am sorry to report, will be far in the future. There is the inescapable time factor in the production of those war munitions which have had no peacetime demands heretofore which cannot be wholly overcome."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YAH! YAH!
YOU'RE BLOOMIN' WELL RIGHT!
THERE'S A MIGHTY STRANGE SIGHT THESE DAYS--A DICTATOR WHO GOES AROUND STOPPING WARS!
SHUCKS, THEY ALWAYS COUNT ON BEIN' STOPPED BEFORE THEY DO ANY DAMAGE! THAT'S WHY THEY ACT SO TOUGH!
MEATS
THE ARMISTICE
J.R.WILLIAMS
COPR. 1940 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
7-26

Navy Appropriation Bill Signed

Washington

• • • **Authorizing appropriations** of $150,000,000 for expansion of existing shipbuilding facilities at private and Government yards, $65,000,000 for additional equipment for munitions and ordnance manufacture, and $35,000,000 for expanding armor plate facilities, the bill to provide a 70 per cent increase in the Navy was signed and approved late last week by President Roosevelt. An authorization measure as distinguished from an appropriation bill, the approved draft is aimed at bringing naval strength up to 3,049,480 tons by 1949.

The measure contemplates a distribution of naval tonnage roughly along these lines: Battleships, 1,045,000 tons displacement; aircraft carriers, 454,500 tons; cruisers, 899,024 tons; destroyers, 478,000 tons; submarines, 172,956 tons. But the Navy Department is given considerable latitude in assigning tonnages of individual ships, as well as discretionary power to shift tonnage from one category to another within certain limits.

Estimates made by Senator Walsh, chairman of the Senate Naval Affairs Committee, are that a 70 per cent increase in naval strength would cost in the neighborhood of $10,000,000,000. His estimate was based on these figures:

Cost of building ships contemplated under the bill, $3,760,000,000; cost of additional shipbuilding, armor and ordnance facilities, $250,000,000; additional appropriations required to complete vessels now under construction, $2,800,000,000; cost of procuring additional planes authorized by the measure, $600,000,000; cost of additional planes already authorized, $1,150,000,000; additional shore facilities, $410,000,000; training of

pilots, $90,000,000; procurement and training of additional personnel, $300,000,000; ordnance equipment, torpedoes, ammunition, $300,000,000.

The measure also lifts the ceiling from 10,000 to 15,000 on naval planes but provides that this limit may be exceeded if the President finds such a step is warranted.

↓ ↓

A Plan to Speed Construction

Washington

• • • **To operate purely** in an advisory capacity, a Construction Advisory Section in the office of the Quartermaster General, War Department, has been formed and will be composed of five civilian members with extensive experience along engineering, architectural and construction lines.

In announcing the organization of the section, which will not be a part of the operating departments of the Quartermaster General's office, Secretary of War Henry L. Stimson said that it will prosecute "vigorously the construction defense program authorized by Congress." In general it will recommend to the Quartermaster General three firms which, in his opinion, appear to be best qualified to undertake a particular construction project. After one of the three firms recommended has been selected, a contract will be negotiated with that company on a cost-plus-a-fixed fee basis.

At present this advisory section comprises the following: Francis Blossom, New York; Forrest S. Harvey, Pasadena, Cal., and F. J. C. Dresser, Cleveland.

Mr. Blossom is a member of the firm of Sanderson & Porter, engineers, New York, and also one of the executive committee of the American Construction Council. Mr. Harvey has been associated recently with Leed, Hill, Barnard & Jewett, Los Angeles, supervising harbor construction at Port Hueneme, Cal. Prior to the World War he was with the Baltimore & Ohio Railroad handling construction of bridges, terminals and conduit work. Mr. Dresser is director of the American Construction Council, a member of the National Association of Housing Officials, a former member of the National Board of Jurisdictional Awards and has been associated recently with the Public Works Administration as a consultant.

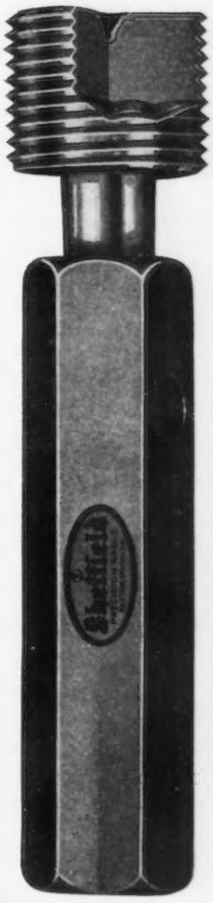
THAT HIGH-LIGHT PATTERN MEANS SHEFFIELD

THE SHEFFIELD plug gages are lapped by a special process developed entirely by Sheffield, which produces that characteristic high-light pattern—your guarantee of the finest in gages and ultimate gage economy.

This lapping process follows finish grinding and removes the outer skin slightly softened by the grinding operation. The lapping takes the surface of the Sheffield Gage down to the hardest layer of metal produced in nitrogen hardening—considerably harder than the surface of conventional gages. In addition, it produces a true cylindrical surface, smooth and accurate.

All Sheffield Plug Gages, both plain and threaded, are Nitrigages with this very hard surface (between 900 and 1100 Monotron Brinell). The base metal, Sheffaloy, is tough and ductile and will not break or chip on accidental impact.

Standardize on Sheffield Gages for maximum economy.



SHEFFIELD
GAGE CORPORATION • DAYTON, OHIO, U.S.A.
MASTER GAGEMAKERS
NITRIGAGES

Fatigue Cracks

BY A.H.DIX

"I'll Be Glad When You're Dead . . '

• • • Last week's letter from Cluett Peabody dug from the grave a word of the Michael Arlen half-decade—"We are *intrigued* . . ." On its way back to the crypt we hope it takes along "reportedly," a monstrosity that is getting quite a play these days. Although four letters shorter than "is reported to be," it is hard on the ears, eyes and tonsils.

Note for Historians

• • • The July 11 New York *Times* had an ad headed, "BOMB-PROOF SHELTERS MADE GAS-PROOF."

Please Squawk

• • • This is from the South African Iron & Steel Industrial Corporation's *Iscor News:*

> *A little girl aged six, who was busy with pencil and paper, was asked by her mother what she was drawing. "I'm drawing a picture of God," she replied. "But," objected the mother, "no one knows what God looks like." The child kept right on drawing and said, "They will now."*

The story reminds us that our favorite scientist, General Motors' Charles F. Kettering, says no one knows just what friction is. We know. It is the heat generated when your favorite family journal is delivered late.

THE IRON AGE is printed with almost newspaper speed. The last form isn't closed until Tuesday night, and before 10 o'clock Wednesday morning the sacks are in the mail train, tagged to get your copy to you at the earliest possible moment. But the best laid plans of Mr. Farley's Railway Mail Service occasionally gang agley—or something may go wrong with a color form—and your copy arrives late. If it happens often we would appreciate a squawk addressed to us at 100 E. 42nd St., 100 E. 41st St., 1 Pershing Square, or 125 Park Ave.

Please Move Left One Space

• • • Sharp-eyed George E. Spotz of Tonowanda, N. Y., underscores this in a recent Youngstown scrap market report, *"No. 1 heavy melting steel is quoted at $193.50 to $20 per ton."*

As the engineer remarked when his bridge collapsed, damn that decimal point.

Good Buy

• • • The shipbuilding program amounts to 499,435 displacement tons and a construction cost of $1,140,000.—Page 71, July 11 IRON AGE.

"We already know," writes George E. Quigley, "that Knudsen is a good purchasing agent, but this was *some purchase.*" Damn those ciphers.

Bell Ringer

• • • The ink had hardly dried on the Wendell L. Willkie editorial in the July 11 issue when the head of a big manufacturing outfit upstate telephoned that he wanted a hundred copies in a hurry. Twenty minutes later another firm phoned in for a thousand copies, and then the parade began. A picture framer in one town said he had so many orders to frame it that two dozen copies would come in useful. The "Willkie-for-President" clubs are tripping over each other in their eagerness to get copies.

If you want a couple of extra copies printed on heavy paper, say the word—no charge. If you want quantities, we will send them at cost.

Loud Bark, Light Bite

• • • News item in the *English Metal Bulletin:*

> The Czech engineering firm, Ceska Maravska Kolben Danak has received an order from Germany for 3,000 dummy armoured motor vehicles for delivery within 50 days. The cars look like light tanks but their chief equipment comprises apparently powerful sirens capable of making an enormous din, the object of which is to create panic.

Posterior Alliteration

• • • The *Satevepost* wonders why no one thought before of using the phrase "callipygian curves," as a polite way of saying, "beautifully buttocked." We used it about three years ago, having picked it up from someone else at the time.

Love Letter

• • • "Your magazine has been of particular value to us during the last six months or so in that a wealth of material has been presented in which we are directly interested."

—From the metallurgist of a large Michigan manufacturing plant.

Salty Sayings

• • • Some people have natural tact, and some blurt out the truth. Bad officials are elected by good citizens who do not vote.

—Geometric Tool Co.'s "Threads"

Puzzles

• • • Last week's insult to your intelligence was accomplished thus:

> First the two sons cross; one returns. The man crosses, and the other son returns. The two sons cross again, and one returns. The wife crosses, and the other son returns. Then both boys cross.

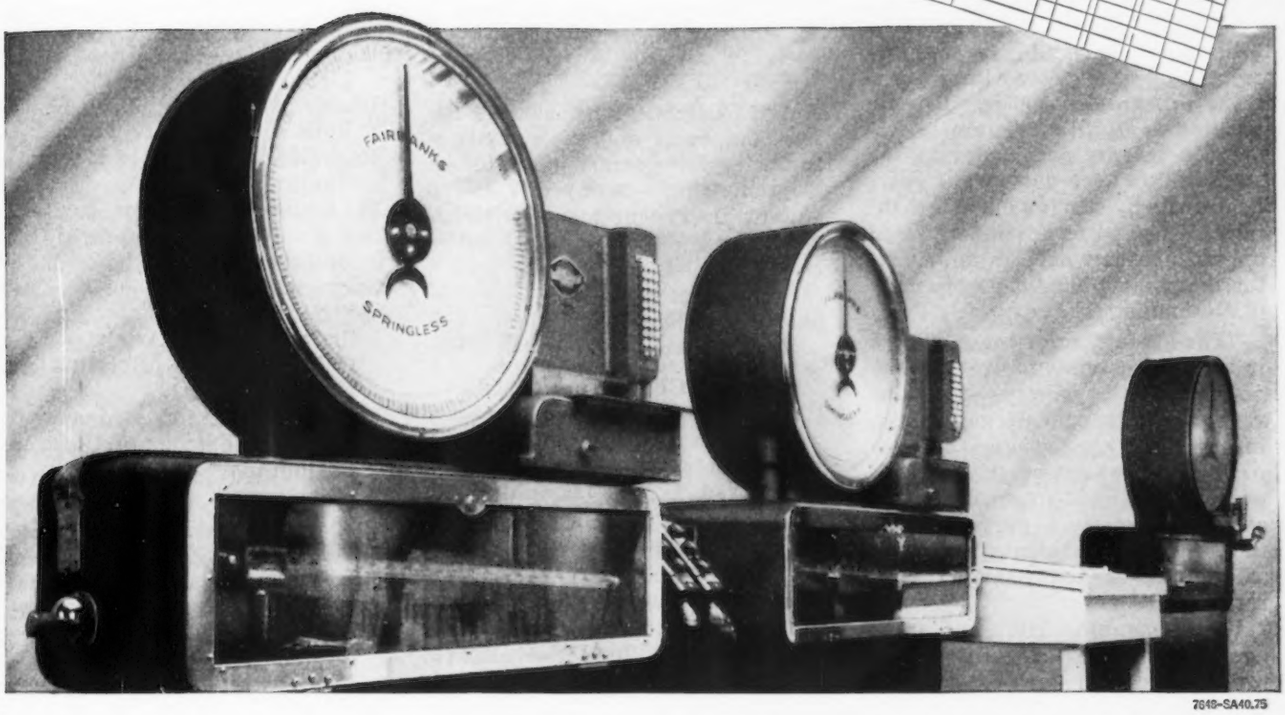
The recent gear problem moves Richard M. *(Business Week)* Machol to cerebrate thus:

> *Given a mobile gear with n teeth. Given a stationary gear with K times n teeth, where K is any integer from one to infinity. How many complete revolutions will the smaller gear make in going completely around the larger. The astounding answer is K plus one!*
>
> *Here's a poser for you. Take a long, thin, straight strip of paper. Give it a half-twist and paste the ends together. How many sides does the resulting loop have? Before answering, try drawing a line down the middle of your loop, continuing till you come back to your starting point.*

It's too hot for that. Try this one. The correct answer within ten minutes gets you a gold star on your report card:

> *A false balance was used to weigh some meat. Put upon one pan, it seemed to weigh 16 lb., and a weight of 20¼ lb. was indicated when it was placed upon the other pan. What was the true weight of the meat?*

Scales that see ...and keep books!



7648-SA40.75

● It costs money to be inaccurate with "tonnage"—and it costs more money to be s-l-o-w.

In one of the most modern coal preparation plants in the world, Elkhorn Coal Company at Wayland, Kentucky, you will find a battery of the most modern scales in the world handling "tonnage" at high speed.

These Fairbanks Scales with "electric eyes" shut off flow to hoppers automatically when the pre-set weight is obtained. A printed record is made of each operation automatically, and an ingenious keying system enters the tonnage to the credit of the miner who mined it.

To make errors in weighing well-nigh impossible, to fit weighing speedily into the production flow, to protect alike the buyer, seller, and all whom weighing affects is the aim of this, the most experienced and most modern organization of scale-makers. There is a Fairbanks Scale for every weighing need. Its facilities and its products are available at your call.

Fairbanks, Morse & Co., Department 47, 600 South Michigan Avenue, Chicago, Illinois. Branches and service stations throughout the United States and Canada.

FAIRBANKS-MORSE

The Greatest Name in Weighing

SCALES

News of Industry . . .

War Materials Suppliers Urged To Deal with Nearest U. S. Office

• • • **Leading industries in** the United States this week had been told by the War and Navy Departments to deal directly with government procurement offices in their territories on all matters connected with defense purchasing. They were told to keep down their overhead costs by staying out of Washington, depending for information on procurement experts now scattered among 73 field offices in most of the industrial states.

"The usefulness of these officers in the field extends to every phase of the problem, whether it be surveys of plants, educational orders, information on national defense procurement, regular 'current' procurement of commodities or any other matters pertaining to the present armament program," said Louis Johnson, Assistant Secretary of War.

Where manufacturers and sales agents can go to negotiate with procurement officers of various government departments is shown in this list prepared from data gathered by the Department of Commerce:

AIR CORPS: Purchases all flying equipment and the necessary facilities for operating air bases.

Dayton, Ohio — Army Air Corps Central Procurement District, Wright Field.

New York—Same, 90 Church Street.

Santa Monica, Cal. — Same, 506 Santa Monica Boulevard.

ORDNANCE DEPARTMENT: Purchases all items of ammunition, weapons, fire control instruments, tools, machinery and supplies used in the arsenals and necessary for the repair and maintenance of ordnance equipment.

Birmingham—Army Ordnance District, 302 Comer Building.

Boston—Same, 2004 Post Office and Court House Building.

Chicago—309 West Jackson Boulevard.

Cincinnati—521 Post Office Building.

Cleveland—1524 Keith Building.

Detroit—611 Federal Building.

New York—Room 1214, 90 Church Street.

Philadelphia—141 Mitten Building.

Pittsburgh — 1032 New Federal Building.

Rochester, N. Y.—1118 Mercantile Building.

St. Louis—935 Custom House.

San Francisco—118 Federal Office Building.

Springfield, Mass. — 3640 Main Street.

Wilmington, Del.—Army Ordnance Office, Nemours Building (for explosives only).

Los Angeles—Army Ordnance Office, 409 Chamber of Commerce Building.

CHEMICAL WARFARE SERVICE: Purchases items having to do with toxic gases, gas defense appliances, incendiary war materials. (Principal purchasing office for normal current supplies is at the Edgewater Arsenal, Edgewood, Md.)

Boston—Army Chemical Warfare Service Procurement District, 2000 Post Office and Court House Building.

Chicago—Same, 1133 Post Office Building.

New York—Room 404, 45 Broadway.

Pittsburgh — 1014 New Federal Building.

San Francisco—117 Federal Office Building.

CORPS OF ENGINEERS: The military branch buys materials and equipment used for field work in connection with a mobilized army.

Chicago—Army Engineer Procurement District, 1117 Post Office Building.

Mobile and Birmingham, Ala.—Office for both at 212 Wilson Building, Mobile.

New York—39 Whitehall Street.

Philadelphia—Second and Chestnut Streets.

(CONCLUDED ON PAGE 61)

Typical Products Bought by War, Navy Departments

(Stars indicate government buying divisions and what they require)

Product	Air Corps	Ordnance Department	Engineers Corps	Quarter-masters Corps	Chemical Warfare Service	Navy Depart-ment
Machine tools	*	*	*	*	*	*
Presses, shearing, punching, bending machines	*	*	*	*	*	*
Welding equipment	*	*	*		*	*
Forging machinery		*	*		*	*
Foundry equipment		*				*
Metals		*	*	*	*	*
Small tools	*	*	*	*	*	*
Furnaces		*	*		*	
Metal cleaners and equipment	*	*	*	*	*	*
Motors, mechanical power transmission equipment	*	*	*	*	*	*
Material handling equipment	*	*	*	*	*	*
Metal parts	*	*	*	*	*	*
Compressors	*	*	*		*	*

(CONCLUDED FROM PAGE 58)

Pittsburgh — 1012 New Federal Building.

San Francisco — 409 Custom House.

QUARTERMASTERS CORPS: Purchases a great variety of items required by the personnel of the Army, classified as motor vehicles, machine and supplies, clothing, etc. (Motor vehicles are purchased through the Detroit office).

Atlanta, Ga.—Army Quartermaster Procurement Planning District—1306 22 Marietta Building.

Boston — Quartermaster Depot, Army Base.

Brooklyn—First Avenue and 58th Street.

Chicago — 1819 West Pershing Road.

Detroit—Planning Office, 611 Federal Building.

Jeffersonville, Ind. — 10th Street and Meigs Avenue.

Philadelphia — 21st and Johnson Streets.

St. Louis — Second and Arsenal Streets.

Fort Sam Houston, Texas—Quartermaster Depot.

San Francisco—Fort Mason.

SIGNAL CORPS: Buys general equipment for communications, photographic purposes, etc., including wire cable, radio, telephone and telegraph equipment.

Brooklyn, N. Y. — Army Signal Corps Procurement District, First Avenue and 58th Street.

Chicago — 1819 West Pershing Road.

San Francisco—The Presidio.

COAST ARTILLERY CORPS: Purchases scientific laboratory equipment and submarine mine equipment and supplies. Most materials are furnished by the Ordnance Department, and Quartermaster Corps, but the Coast Artillery Corps, largely through its offices at Fort Monroe, Va., purchases such materials as anchors, land and submarine cables, electrical equipment, mine cases, and mooring rope.

NAVY DEPARTMENT: Purchases a wide variety of materials of a military and non-military character through its purchasing offices in the following 23 cities:

Alameda, Cal. — Supply Officer, Naval Air Station.

Anacostia, D. C.—Naval Air Station.

Complete List of U. S. Purchasing Agencies

• • • A complete list of government procurement offices buying equipment and material from the metal-working industries is included in the accompanying news article. To hasten the national defense program and to cut their selling expenses, U. S. manufacturers and sales agents are requested to deal directly with the nearest procurement office.

Annapolis, Md.—Naval Academy.

Boston—Navy Yard.

Charleston, S. C.—Navy Yard.

Dahlgren, Va. — Naval Proving Ground.

Great Lakes, Ill.—Naval Training Station.

Indian Head, Md.—Naval Powder Factory.

Key West, Fla.—Naval Station.

Lakehurst, N. J.—Naval Air Station.

New London, Conn. — Submarine Base.

New York—Officer - in - charge, Navy Purchasing Office, P. O. Box 9, Station C.

Newport, R. I. — Officer-in-Charge Navy Purchasing Office.

Norfolk, Va. — Supply Officer, Naval Air Station, or Officer-in-Charge, Naval Supply Depot, Naval Operating Base.

Pensacola, Fla.—Naval Air Station.

Philadelphia—Navy Yard or Naval Aircraft Factory.

Portsmouth, N. H.—Navy Yard.

Portsmouth, Va. — Norfolk Navy Yard.

Puget Sound, Wash.—Navy Yard.

San Francisco—Navy Purchasing Office.

San Diego, Cal.—Supply Officer, Naval Air Station, North Island or Officer-in-Charge, Naval Supply Depot, Naval Operating Base.

Washington, D. C.—Naval Yard or Naval Research Laboratory.

Yorktown, Va.—Naval Mine Depot.

For minor current purchases needed by local offices, there are purchasing and contracting offices in approximately 500 Army posts and offices, not including such offices outside the continental United States. The Army Department's Medical Corps has offices in four cities.

Coming Meetings

July 22 and 23—Institute of Scrap Iron and Steel, mid-year meeting, Buffalo.

Sept. 3 to 6—American Society of Mechanical Engineers, fall meeting, Spokane, Wash.

Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.

Oct. 14 to 16—American Gear Manufacturers Association, semi-annual meeting, Skytop, Pa.

Oct. 21 to 25—National Metal Congress, Cleveland.

Oct. 31 to Nov. 2—Society of Automotive Engineers, national aircraft production meeting and exhibition, Los Angeles.

Callite Tungsten Corp. To Expand in Alloy Wire

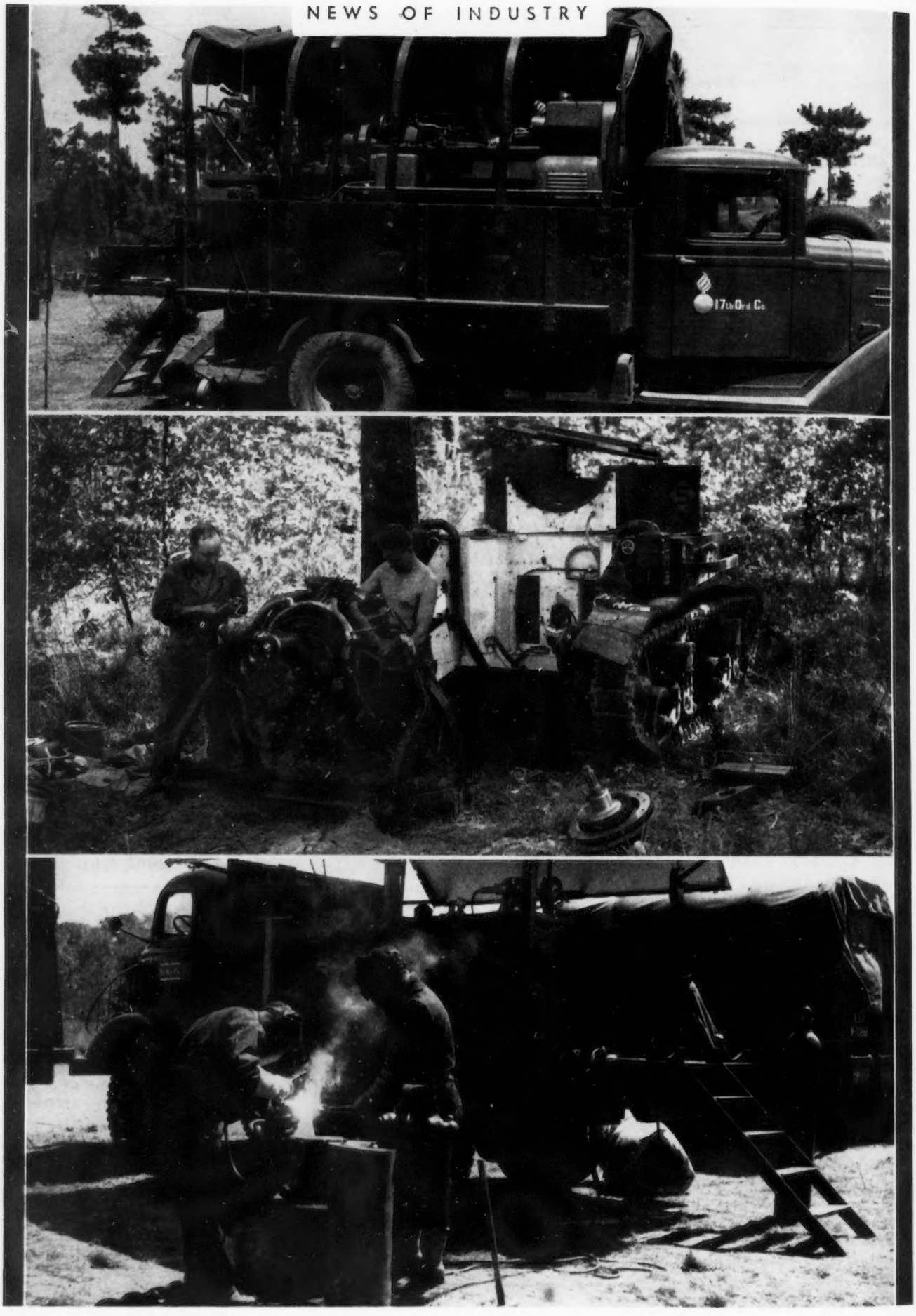
• • • An expansion of the activities of the Callite Tungsten Corp., Union City, New Jersey, in the wire manufacturing field has been announced by Charles H. Kraft, president, who stated that henceforth his company will manufacture stainless steel, monel, phosphor-bronze and beryllium-copper wire, brush wire and Fourdrinier wire, and various other special alloy wires.

Mr. Kraft said that Callite Tungsten has completed the first step in its expansion program with the purchase of the business of Harris Alloys, Inc., of Newark, N. J., as a nucleus from which to build in the manufacture of quality alloy wire products.

Vega Airplane Co. Awarded $30,000,000 Order

Burbank, Cal.

• • • Vega Airplane Co. has been awarded a contract to build a quantity of new-type, twin-engined bombing planes and a substantial amount of spare parts for the British government at a cost of approximately $30,000,000, it was announced by Courtlandt S. Gross, president. The order is a sub-contract from the Lockheed Aircraft Corp. which has previously delivered several hundred fast bombers to England. The planes will be built at the new Vega factory being erected adjoining Union Air Terminal here.


17th Ord. Co.

Drastic Machine Tool Priorities Not Likely Soon

Washington

• • • Members of the defense committee of the National Machine Tool Builders' Association, meeting in Washington for the first time since the Secretary of the Treasury relinquished his machine tool coordinating activities to National Defense Commissioner William S. Knudsen, were told last week that, although the President was given authority in recent legislation to establish priorities for defense requirements, present plans call for a purely voluntary arrangement on the theory that it is preferable to continue on a cooperative basis as long as possible before invoking more drastic action.

While representatives of the War and Navy Departments and the National Defense Advisory Commission emphasized that under the voluntary plan it will be impossible to suggest a definite percentage of machine tool defense allocations applicable to all manufacturers, members of the industry's defense committee were advised that "obviously substantial percentages of capacity will ultimately have to be reserved for defense needs."

The scheduled machine tool meeting was referred to in Mr. Knudsen's progress report made public by the White House on July 16, when it was announced that it would take up "a cooperative plan under which a definite percentage of machine tool manufacturing facilities will be reserved for defense needs." Conferees said after the meeting that nothing definite was determined along the lines of fixing specific proportions as between defense and other machine tool orders, but that in general the suggested percentages will vary with different manufacturers, some of whom have an excess of capacity, and with different types of machines.

Representatives of the machine tool industry were assured by Mr. Knudsen that with a continuation of the industry's cooperative spirit there will be no necessity for resorting to drastic steps to establish priorities. Members of the industry who have evidenced a desire to learn more about the machine tool requirements of the enlarged defense program were promised by Col. H. K. Rutherford, chief of the Army's Planning Branch, that they will be furnished with advance information from which they will be able to make their plans accordingly.

Industry members were represented after the conference as feeling that with such assurances they will now lose no time in adjusting their facilities in the interest of national defense.

Other conferees included H. B. Vance, board chairman of the Studebaker Corp., who is Mr. Knudsen's consultant on machine tools; Donald M. Nelson, coordinator of defense purchases; Brig. Gen. Charles T. Harris, assistant chief of Army ordnance; Capt. Edmund D. Almy, of the Navy's shore establishment division; and the 15 members of the machine tool builders' defense committee headed by Clayton R. Burt, president of Pratt & Whitney, Hartford, Conn.

Mr. Vance, who has been in Washington almost continuously since being named to Mr. Knudsen's staff, although he plans to serve on a part-time basis, reiterated to THE IRON AGE that the embargo authority, contained in the recently approved May-Shepperd bill, has contributed substantially to the retention in this country of vital machine tools which otherwise would have been exported.

Wrapping into one bundle authority which had previously been invoked in a limited way under the so-called "moral" embargo and various other cooperative mediums for preventing or delaying exports of essential materials, the new export license restrictions has been in effect since July 5 and thus far has been responsible for the detention of some machine tools because of State Department refusal to issue the necessary export licenses.

For the present the department has adopted a rigid "no publicity" rule with regard to export restrictions, although the policy of its division of controls in administering the arms embargo provisions of the neutrality law has always been to make monthly statements on the value of arms exported and the countries of distribution. Information on the types of machines and countries affected by reason of State Department refusal to issue export licenses will not be divulged.

In accordance with the precedure adopted after enactment of the May-Sheppard bill, Lieut. Col. Russell L. Maxwell, administrator of export control under the new authority, has the job of determining, with the advice of the War and Navy Departments and members of the defense advisory commission, which items in the list of products are to be embargoed.

Attaches at the State Department insist that since the export restriction was invoked July 5 there has been no particular delay in clearing licenses, although it

MOTORIZED DIVISIONS in the new U. S. Army will include no units more important than the portable machine shop, shown in views on the opposite page. The center IRON AGE news photo shows field maintenance men repairing a radial air-cooled tank motor.

Are We Fit For Liberty?

• • • About 80 years ago John Stuart Mill wrote an essay "On Liberty" from which the following is quoted:

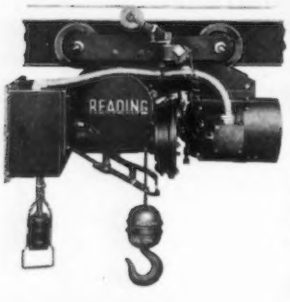
"A people may prefer a free government, but if, from indolence, or carelessness, or cowardice, or want of public spirit, they are unequal to the exertions necessary for preserving it; if they will not fight for it when it is directly attacked; if they can be deluded by the artifices used to cheat them out of it; if by momentary discouragement or temporary panic, or a fit of enthusiasm for an individual, they can be induced to lay their liberties at the feet even of a great man, or trust him with powers which enable him to subvert their institutions; in all these cases they are more or less unfit for liberty; and though it may be for their good to have had it even for a short time, they are unlikely long to enjoy it."

was conceded that in some cases there has been a slight delay of "a week or so" pending determinations from Col. Maxwell's office. They emphasized that in the initial period it was impossible to act upon all applications simultaneously, explaining that the whole process has been handled with "reasonable dispatch."

A list of products on which export licenses must be obtained is set forth in detail in THE IRON AGE for July 11, page 74. Briefly, they include aircraft parts and equipment; armor plate; machine tools of all kinds; aluminum, antimony, chromium, manganese, molybdenum, tin, tungsten, vanadium; arms, ammunition and implements of war; and a group of 11 chemicals.

READING

MATERIAL HANDLING EQUIPMENT



3 WAYS TO LIGHTEN LIFTING TASKS

THE READING TRAVELING CRANE

Moves big jobs for industry. Lifts and carries loads up to 10 tons. Obtainable in span widths from 10 to 100 ft. Bridge type girders prevent any undue deflection even with the full working load in the center of the beam. Can be furnished with floor, remote or cab control.

READING LOW MAINTENANCE ELECTRIC HOISTS

Designed for utmost flexibility in application and for a minimum of moving parts—only 12. 5-unit design permits repair or replacement of any unit without disturbing other parts of hoist. Capacities of this model range from ¼ ton to 2 tons. Other models, for greater loads up to 12 tons.

THE READING BALL BEARING HOIST

Only 14 major parts comprise the simple construction that has made this Reading Hoist our leader. Greatest possible efficiency is obtained through balanced train of spur gearing which operates the main chain sheave on ball bearings. Self adjusting brake mechanism holds load stationary at any point.

. . . . .

Reading material Handling Equipment is built by specialists of many years' experience in our own plant. Reading Products are backed by a sound guarantee. Catalogs on request.

READING CHAIN & BLOCK CORPORATION

READING PENNSYLVANIA

C-I's South Works Sets Output Record

Chicago

• • • **Carnegie-Illinois Steel Corp.'s** South works made new all-time production records during June, both in the blast furnace and open-hearth steel divisions. Operating an average of 8.83 blast furnaces (eight were on in the early part of June, with nine on later in the month), a total of 261,757 net tons of pig iron was produced, compared with the previous record made in August, 1937, when 255,640 net tons of iron were made. A total of 276,491 net tons of open-hearth steel was produced at South works in June, compared with a previous record in May, 1937, when 267,754 tons were produced.

Scrap Consumption Gains 14% in June

• • • **Domestic consumption of iron and steel scrap increased 14 per cent in June to 3,482,000 gross tons, according to the estimate of the Institute of Scrap Iron and Steel.**

June consumption compared with 3,061,000 gross tons in May, and 2,221,000 in June, 1939. In the first half of 1940, indicated domestic consumption of scrap was 18,212,000 gross tons, contrasted with 13,214,000 tons in the first half of 1939.

Exports of scrap thus far in 1940 have averaged 230,467 gross tons monthly, compared with an average of 295,965 tons in 1939. Exports this year have been averaging 1/14th of domestic consumption.

Williams Aircraft Co. Studies Plastic Planes

Toledo

• • • **Williams Aircraft Corp.,** recently incorporated by Col. Roger Q. Williams and associates, is planning construction of a hangar-type factory at Franklin Airport near Toledo. Eventual manufacture of plastic airplanes is planned. The company now has some orders for plane parts and equipment. Williams, the president, won recognition on a non-stop flight from New York to Rome.

INDUSTRIAL PLANT

ADAPTABLE TO MANY USES —IN EASTERN ZONE

RARE OPPORTUNITY

16.49 acres • 300,000 sq. ft. of floor space • 2.02 miles of R.R. track • 100% sprinkler fire protection • All main buildings of brick and steel • Equipped with overhead cranes • Good rail and main through highway connections • Good local native labor conditions • Subject to moderate ground rent • Asking price $400,000 • Subject to negotiation as to terms.

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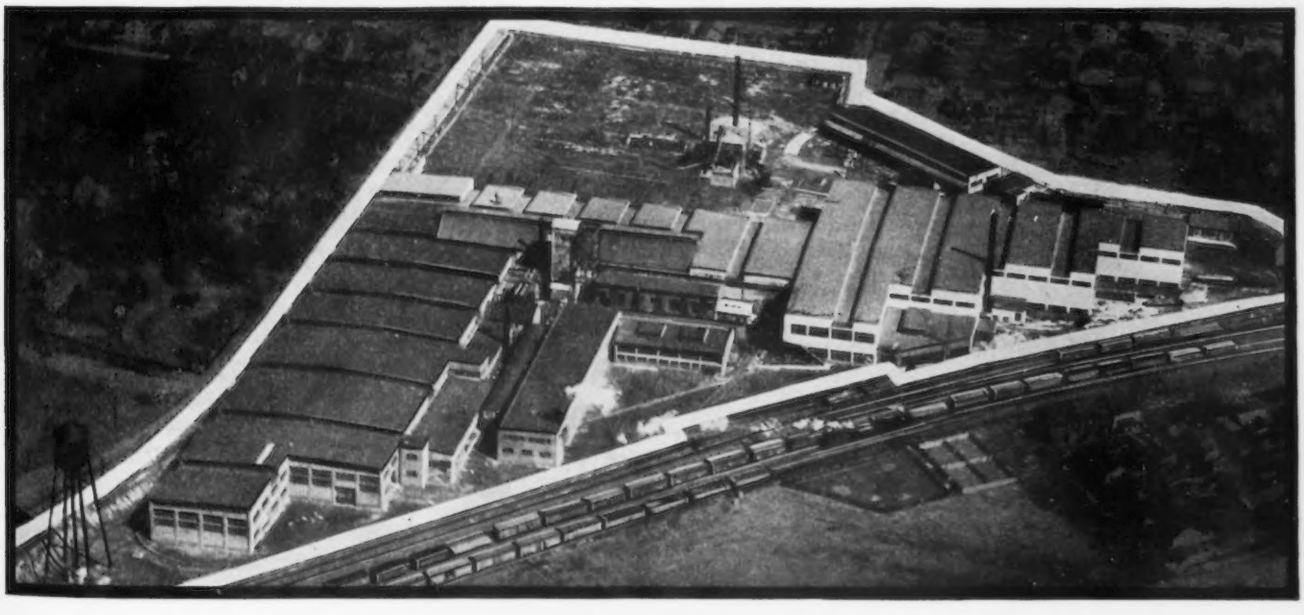

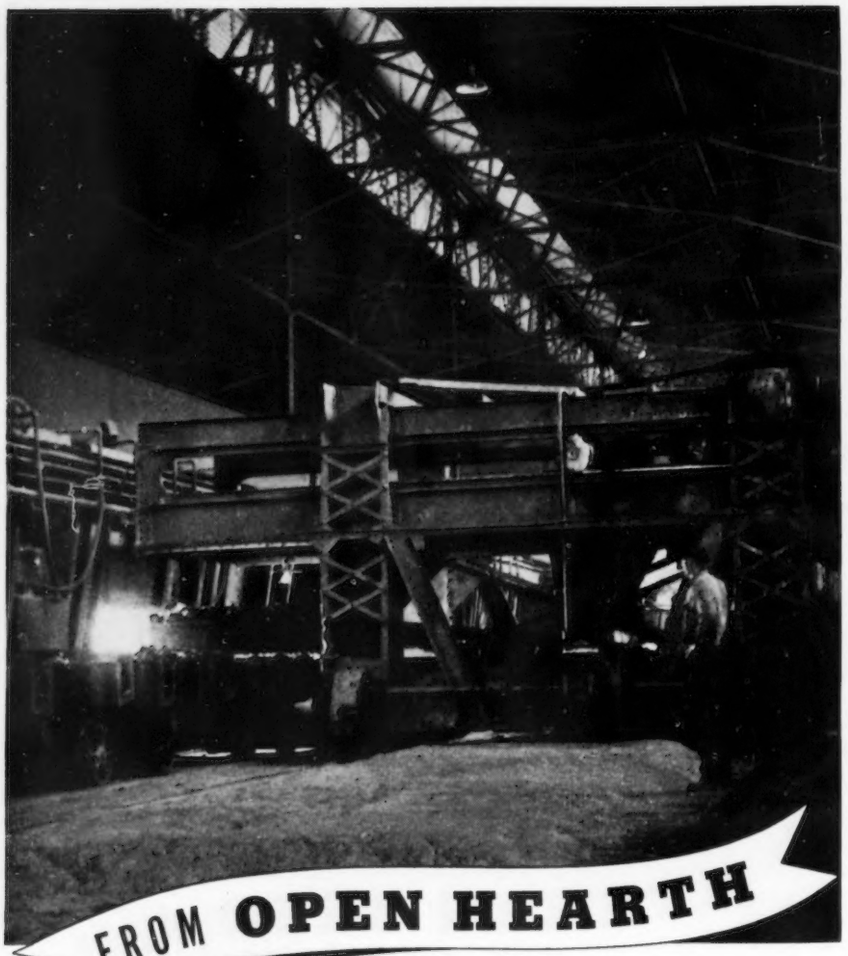

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TO *Finished Product*

Add to this the constant research and supervision of expert metallurgists and the experience of a trained personnel, and you have the story back of the high quality which Standard has maintained for more than half a century.

Standard specializes in steel castings and forgings of unusual size and design to meet your requirements.

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

STANDARD STEEL WORKS

Division of THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

BLW THE BALDWIN GROUP

Koppers Co. Develops Automatic House Stoker

Pittsburgh

• • • **Koppers Co. has** just completed several years of experimentation in the perfection of a wholly automatic domestic coke stoker which can be sold within a moderate price range. The Bryant Heater Co., Cleveland, will manufacture the stoker and conduct a merchandising campaign.

877 Join Defense Classes At Toledo

Toledo

• • • **Classes in vocational** training to fit 877 men for national defense jobs started here July 15 in three public high schools. There were 1700 applicants for the classes. The courses include welding, machine shop, auto mechanics, aero mechanics, auto collision service, welding, sheet metal, mechanical drafting, tool design, blueprint reading and shop mathematics.

Britain Takes Full Control Over Supplies of Steel

London

• • • **Full control over** the consumption of steel for whatever purpose is now in operation throughout the United Kingdom, and no further supplies for the construction of buildings, theaters and other structures not immediately connected with the necessities of the war will be made available.

Greer Steel Employees Vote Against AFL Union

• • • **Employees of Greer** Steel Co., Anderson, Ind., have voted 69 to 40 against selection of the UAW-AFL as sole bargaining agent in an election supervised by the National Labor Relations Board.

Paint Companies Merge

• • • **The American Asphalt Paint Co.,** Chicago, and its subsidiary, the Marietta Paint & Color Co., Marietta, Ohio, have been consolidated and are now operating as one corporation known as the American-Marietta Co., according to an announcement of Grover M. Hermann, president of the new company. General offices are at 43 East Ohio Street, Chicago.

Automobile Sales 28% Up In First Half Over 1939

Detroit

Retail sales of cars and trucks in the United States were 28 per cent higher during the first six months of this year than during the corresponding period of 1939, according to the Automobile Manufacturers Association.

June sales of 350,968 passenger cars and 51,273 commercial vehicles lifted 1940 totals to 1,849,431 and 317,787 units, respectively. Comparable 1939 sales were 1,420,236 cars and 266,752 commercial vehicles.

Preliminary figures on new cars registered in June shows that the month is 29.02 per cent higher than the same month in 1939, according to R. L. Polk & Co.

Machine Guns to Take Millions of Chain Links

Rock Island, Ill.

• • • **The apparent low bidder** on maximum quantities of metallic links for feeder chains for .30 and .50 caliber machine guns, was the Bernard Austin Aviation Equipment Co., Ashley, Pa. The advertisement called for between 40,000,000 and 70,000,000 links for the .30 caliber gun and between 20,000,000 and 70,000,000 links for the .50 caliber gun. More than $900,000 was involved in the bid.

Wisconsin Payrolls Up Substantially in June

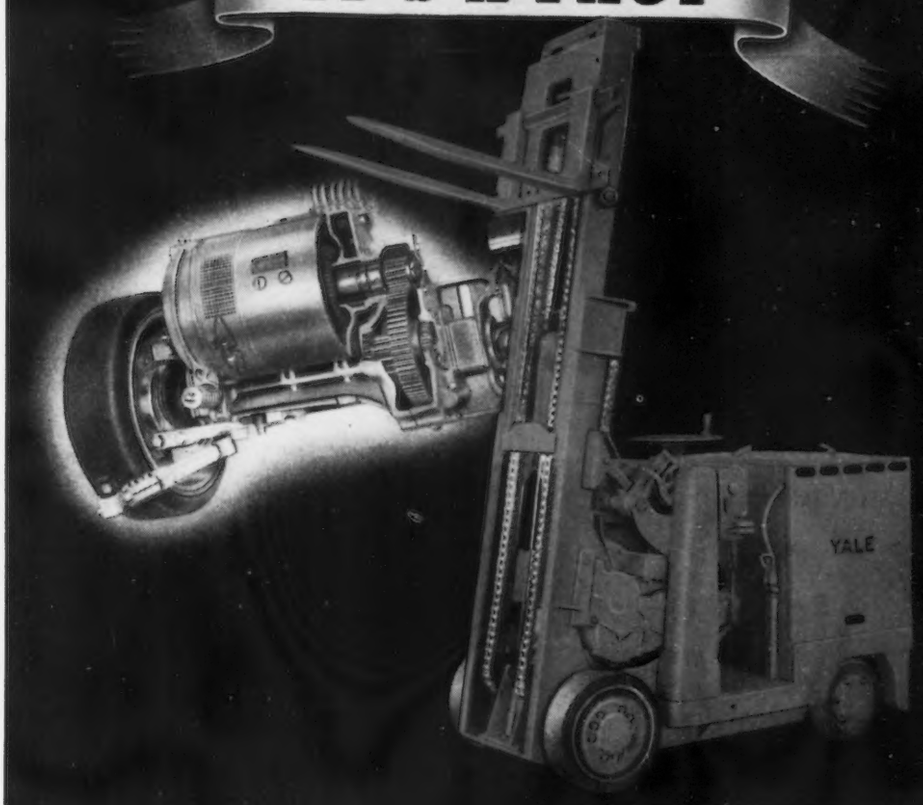
Milwaukee

• • • **Employment and weekly** payrolls in Wisconsin showed a substantial increase in June over those of May, according to the state industrial commission which reports that machinery manufacturing companies had the largest boost in factory employment, about 16,000 over a year ago.

Welding Society Announces Annual Meeting Program

• • • Fifty-nine technical papers covering practically every phase of welding, cutting and treating processes will be presented at the 15 technical sessions planned for the annual meeting of the American Welding Society, to be held in conjunction with the National Metal Exposition, Cleveland, Oct. 20 to 25.

IT'S A FACT



YALE ELECTRIC TRUCKS

are better!

BETTER—FASTER—MORE ECONOMICAL. Those four words tell the story of Yale Electric Industrial Trucks—and Yale Trucks apply those words to handling operations.

No matter what your handling problem, there's a money-saving Yale Truck for the job. The complete line includes low-lift and high-lift platform, fork, ram and crane models in capacities for every need.

In addition, basic underlying features make Yale Trucks do superior work longer. Here are a few of them:

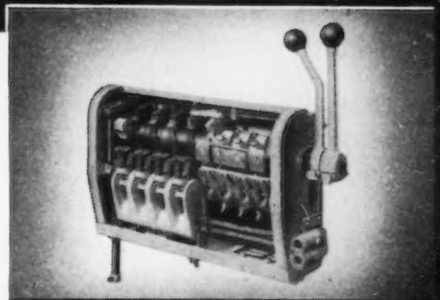
1. Drive Unit . . . uses straight spur, or combination of bevel and spur gears. Gears are drop-forged, chrome-nickel, heat-treated steel, cadmium plated for longer life. For smooth operation, they are mounted on roller bearings and move in an oil bath. Here's *extra* power 24 hours a day!

2. Cam-O-Tactor Controller . . . Positive mechanical cam and roller action makes and breaks contacts, guards against welding of contact points. Permanent alnico blow-out magnets instantly quench arc—lengthen contactor life. This improved simplified controller is safer, trouble-free—means fewer costly repairs and lost hours.

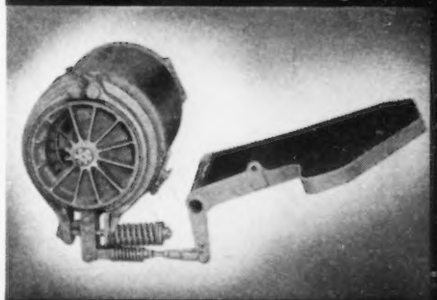
3. Driving Brake . . . mounted directly on motor end head, operates on a high-speed cast-iron drum and transmits the braking action to both driving wheels via a train of gears and differential. Regardless of operating conditions, it brakes the power at the source—gives operator the added safety of simultaneous braking on both drive wheels.

4. Drive Wheels . . . are electrically welded disc steel type, mounted to the driving flange by specially hardened steel dowel bolts. Wheels can be easily demounted without exposing the sealed bearings or disturbing alignment. Servicing time reduced to a minimum!

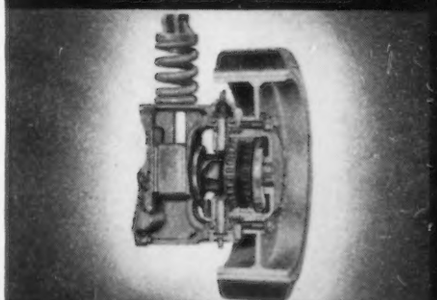
There is a Yale Electric Truck for *your* handling job. The Yale representative (listed in the Classified Directory) will be glad to tell you about it. Or write to us direct.



CAM-O-TACTOR CONTROL



DRIVING BRAKE



DRIVE WHEEL

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

YALE

Makers of Yale Hand Chain Hoists, Electric Hoists, Electric Industrial Trucks, Hand Lift Trucks and Skid Platforms.

Tooling up for New Job Takes Time, Motor Car Industry Has Found

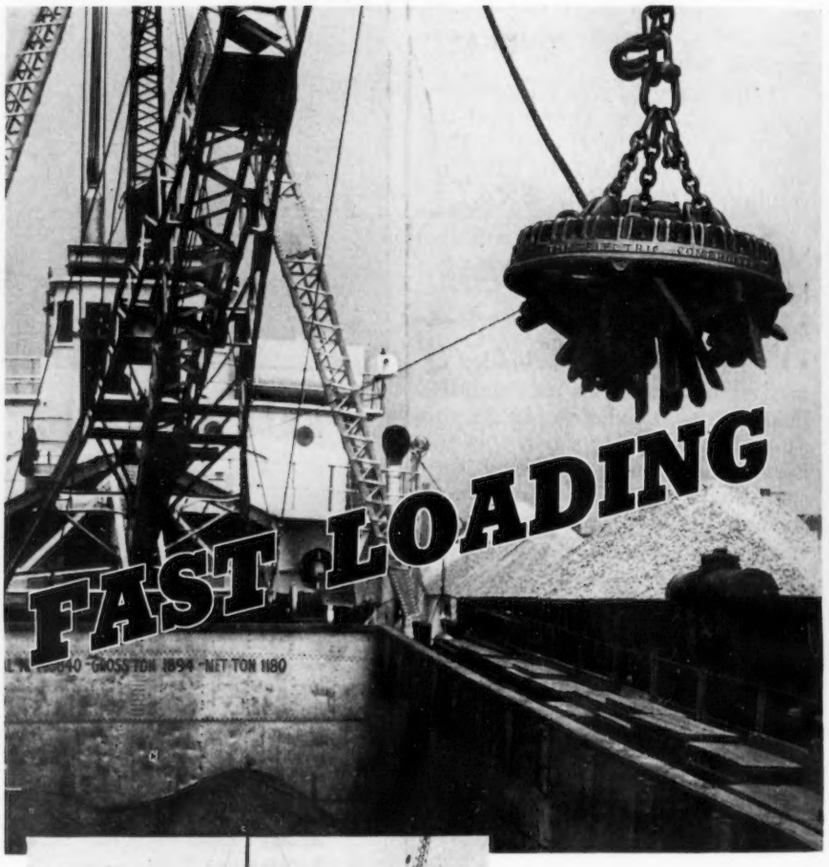
Detroit

Periodically, on an average of every two or three years there come reports of a "major program" in some automotive plant. Just what is the extent of a "major program"? Perhaps if a little more were known of the details of the big shake-up in automobile plant equipment, there would be a better understanding of the kind of a job involved in tooling, or retooling, any one of these plants to produce a new product such as airplane engines, tanks, shells, or whatever else might be allocated in the national defense program. Moreover, an appreciation of the voluminous details of planning will help to explain the time required before a major program can get under way.

Sometimes major programs are instituted in connection with the introduction of a new car or a radically different type of car from that previously in production. At other times, huge retooling expenses are incurred when some relatively minor change is made in design of product, i.e., where dimensional changes are such that machine tools on the job will not fit the new part to machine them. At other times, some fairly extensive programs have been undertaken largely to lighten the burden of manufacturing costs. Cases have arisen where accumulated minor changes in design of parts or minor acquisitions of new equipment have disarranged the original plant layout to such an extent that manufacturing costs have risen beyond reasonable levels. In these cases there are instances where elaborate programs were required solely to put production back on an efficient basis.

An inkling of the time required and wholesale readjustments necessary for a major change can be gleaned from a study of the expense in 1927 when Ford junked his Model T and prepared for production of the Model A. Ford factories shut down for alterations in the spring of 1927 and it was Dec. 2 before the new car was offered for sale. Here is what the Federal Trade Commission, in its recent report on the motor vehicle industry, has to say about this changeover:

"The structure of Model A was very different from that of Model T. In consequence, much of the plant that had been designed, laid out, and erected for the purpose of manufacturing the motors and other parts of the Model T was not adapted to carrying on the specific processes involved in the manufacture of the parts of Model A; and the plant had to be reconstructed in considerable part. It was also decided to transfer the plant from Highland Park to River Rouge. There had been previous partial reconstruction of the Ford plant, but these had not involved complete cessation of production, inasmuch



EC&M No. 6 Type SA 65-inch diameter Lifting Magnet on Freighter "Tampico," owned and operated by Nicholson Transit Co. of Detroit, which has paid for itself many times over through high speed loading and unloading during several seasons of successful operation.

Pays for itself quickly -- by shorter time at dock.

as, preparatory to reconstruction of a section, a large stock of parts involved was accumulated so that assembly of the completed cars could go on in undiminished volume during such partial reconstruction.

"The reconstruction in 1927 was wholesale, however; the plant was shut down in the spring 1927, except for the manufacture of model T parts, and the new plant did not commence operations until the following autumn.

"It is said that approximately 40,000 machines in the old plant were scrapped and were replaced in the new plant with machinery of more modern design and adapted to the manufacture of parts of Model A; also that the entire power plant at Highland Park was abandoned and was replaced at River Rouge with turbo-generators developing 250,000 hp., or more than twice the amount previously used. It is also said that reconstruction of this plant cost the Ford Motor Co. approximately $100,000,000."

An example of what redesign of an engine may mean to the tool engineers of the industry is found in Chrysler's 1937 model program when the six-cylinder engine for Chrysler and DeSoto cars was so redesigned that the power plant was virtually a new one. Chrysler production engineers completely revamped the machinery set-up for manufacturing cylinder blocks, crankshafts, camshafts, pistons, connecting rods and other components. It was found both practical and economical to rebuild many of the 59 machines in the final engine line.

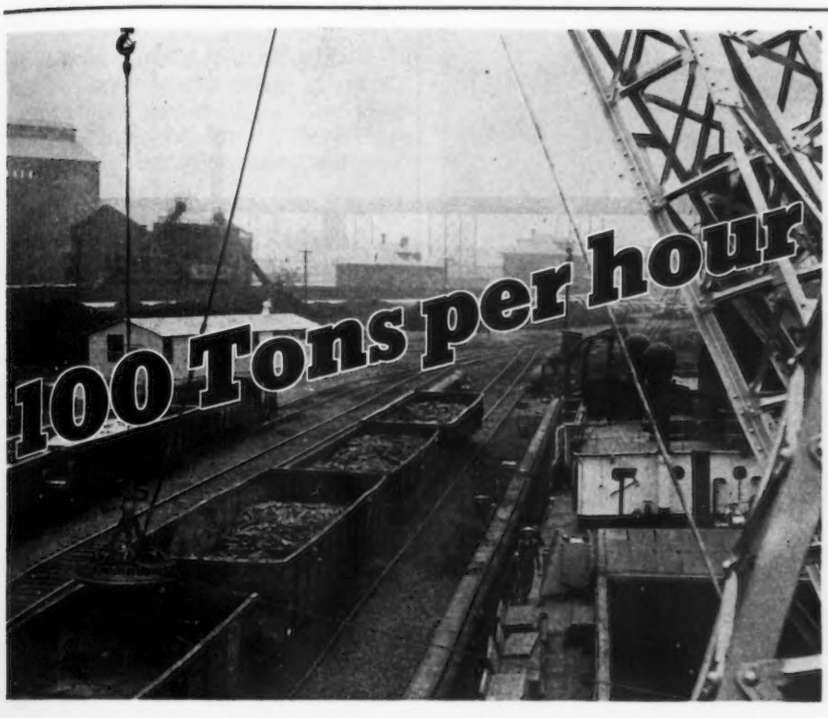
Yet this change falls far short of comparison with the 1932 move when Plymouth went from four cylinders to six. The decision to make that change sent to the industrial graveyard 80 per cent of Plymouth's machinery for making the car's power plant. New tools and dies for the change cost $2,000,000 and an equal amount was spent for new factory equipment and machines for producing various parts.

For 1940 production, Packard rearranged its entire plant and effected important savings in manufacturing costs, thereafter reducing car prices. Packard's rearrangement plan was the culmination of a four-year manufacturing program. Out of the management philosophy activating this program evolved an entirely new plant—new in arrangement, new in layout, and new in basic manufacturing procedure when compared with the Packard plant of but a year before.

This program was conceived in 1935, the year when the Packard 120 was introduced. Public acceptance of the 120 and its subsequent companion, the Six, began to strain the then new production facilities and impressed the management with the ultimate need for a new expansion program.

Layout engineers undertook the practical problem of visualizing a complete recasting of a plant spread over an expanse of 89 acres, while this plant still was busily engaged in turning out cars for the immediate market.

They took on the job knowing that it was necessary to demolish



MORE TRIPS per Season possible with EC&M LIFTING MAGNETS

These illustrations represent maximum efficiency in loading boats. The EC&M Lifting Magnet makes possible fast handling of cargoes—as much as 100 tons per hour, in or out of the boat. And the magnet works equally as well in rain or sunshine. Also, it doesn't require time-out for lunch but can be kept busy continuously, when desired.

Several prominent ship operators have equipped their boats with EC&M Lifting Magnets. They know the EC&M ribbed-case construction (an exclusive EC&M feature) insures large heat-radiating surface. This is an important advantage because it maintains lifting capacity at a high rate during periods when the magnet is worked continuously.

Stevedoring companies, and warehouse terminal corporations are also large users of EC&M Lifting Magnets. In Bulletin 900, complete data on lifting capacities, sizes, typical applications, unusual handling problems, etc. are well illustrated and completely described. Write for your copy to-day.

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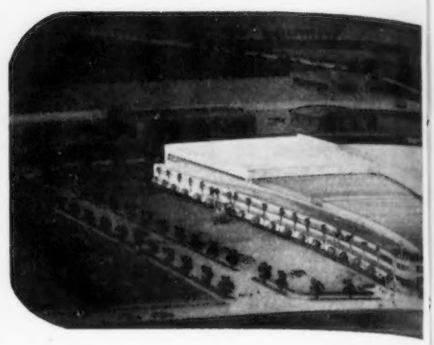
HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

HILLSIDE FLUORSPAR

85% AND OVER IN CALCIUM FLUORIDE · DOES NOT EXCEED 5% IN SILICA · FREE FROM SULPHIDES, LEAD AND ZINC

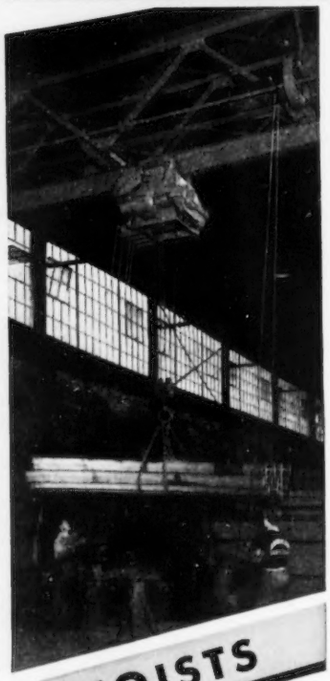
Steel Manufacturers
Standard Specifications
Shipments from stock
Rail or River

HILLSIDE FLUOR SPAR MINES
38 SOUTH DEARBORN STREET CHICAGO, ILL.
MINES IN ILLINOIS AND KENTUCKY



GREATER OVERLOAD CAPACITY
MORE HOOK LIFT
HIGHER SPEEDS

Built in capacities of 1 ton to 20 tons—floor or cab control—Northern electric Hi-Lift Hoist offers many advantages on any type of monorail system. • Northern Hi-Lift Hoists have machine cut gears, roller bearings, welded steel frame—the characteristics of a sturdy, well built job. • Illustrated is a Northern Hi-Lift in a steel fabricating plant. Hard continuous service in this plant has proved the quality of the hoist. • Write for catalog.



NORTHERN HI-LIFT HOISTS

NORTHERN ENGINEERING WORKS, 2607 Atwater St., Detroit, Mich.

CRANES Northern HOISTS

what was and create an entirely new pattern.

Suggestions that the automobile industry might now develop, on the spur of the moment, as it were, satisfactory high-powered aircraft engines, tank engines, etc., where designs for such products are lacking now, are complementary to the automobile industry but are not practical suggestions. In no other industry perhaps is time so precious as it is in the development of new automobiles to reach the market each fall, yet the industry always allows itself plenty of time, whatever the cost, before it attempts to introduce anything radically new to the public.

One of the most recent wholesale changes in automobile design occurred at Chevrolet in the engineering of the 1937 Chevrolet. James M. Crawford, chief engineer of Chevrolet, has said:

"The decision to produce the 1937 model in its final form was made about the time its predecessor —the 1936 model—was started in production.

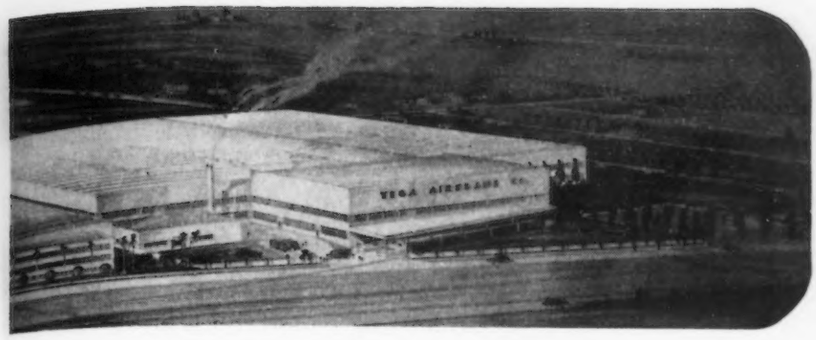
"This decision could be made only because it was based on designs of various major units that had been on the drawing boards and on test *since early in 1934.*

"The chassis designs and body models based on the use of these units were completed by Dec. 1, 1935—or 11 months before the car was introduced to the public."

The fundamental characteristics of Chevrolet's box-section frame, which must be considered in working out a new body design, were determined in 1934 and built into the Chevrolet standard model in 1936, he explains.

"Thus," says Mr. Crawford, "40 per cent of passenger-car volume was used to work out the production problems in the frame. Drafting room work actually started March 7, 1934."

Here is part of the time-table



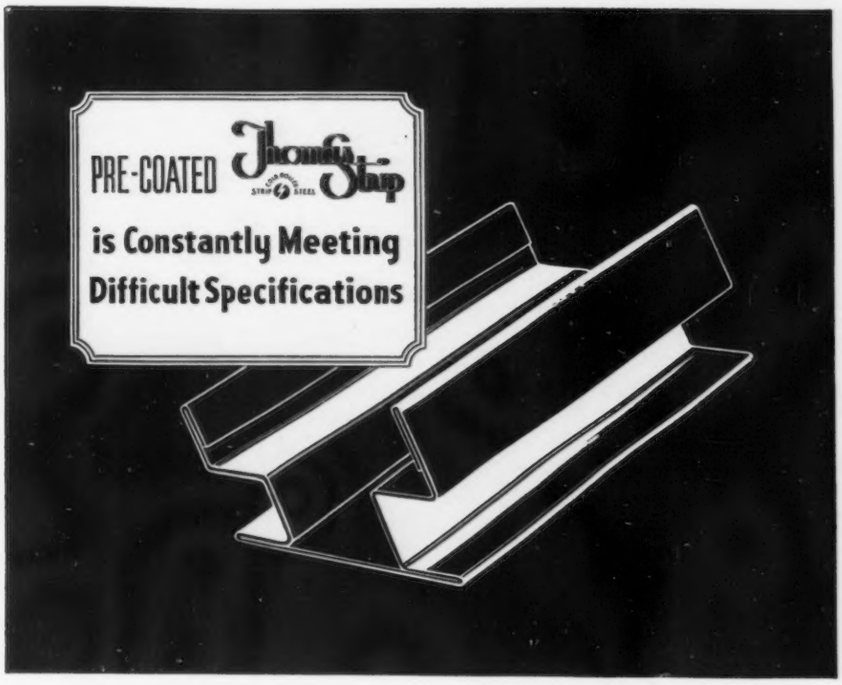
This sketch shows the new $3,500,000 plant of the Vega Airplane Co., Lockheed Aircraft Corp. subsidiary, as it will look at Burbank, Cal., following completion within four months. The plant will have an initial capacity of four large bombers or 15 small planes daily.

which the 1937 Chevrolet engine followed:

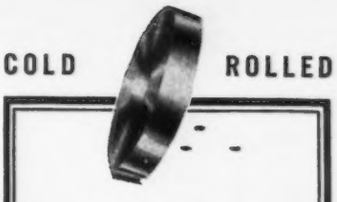
April 3, 1934—work started on new Chevrolet engine. *November, 1934*—two engines ready for tests, one in the engineering laboratory and one at proving grounds. *November, 1934*, two weeks later—dynamometer test on engine in the laboratory brings out lack of durability of the main bearings, and the proving ground tests are discontinued at the end of 17,000 miles. *April 23, 1935*—a third engine, replacing the others, is now completed and ready for tests. *Oct. 18, 1935*—After trials at the proving grounds in which 18 engines of the third design participated, the management approves adoption of the engine for further development.

After this last decision a more intensive study was made by the Chevrolet manufacturing department, and recommendations were made to change the crankshaft design to permit new methods being used in the boring of cam and crankshaft bearings. After the crankshaft design was changed, new sample engines were installed in test cars. Unfavorable results were reported. So, in order to study the problems brought out by these changes, special instrumentation dealing with dynamics was developed in the General Motors Research Laboratory and used in the Chevrolet laboratory to find the source of the trouble. A major change was then made which affected not only the crankshaft and case but the wheelbase as well. This change was approved April 9, 1936, as a result of rebuilding and testing several engines, and at no loss of time in production—due largely to the engineering department's method of releasing tooling and equipment in accordance with the results of tests.

That is the kind of development work which must be behind any engine which the industry might now start to produce for defense



The Thomas organization is geared to meet difficult specifications so accurately and dependably that manufacturers' production costs are often reduced. The electro coated finishes have also provided new manufacturing economies, product improvements, or both. Send today for working samples specifying gauge, width, temper and finish, or have one of our representatives call.



BRIGHT FINISH UNCOATED
AND ELECTRO COATED WITH
NICKEL, ZINC, COPPER,
BRASS, BRONZE, AND TIN

THE THOMAS STEEL CO.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
WARREN, OHIO

purposes. Except in cases where completed designs are submitted for the industry to produce, similar development work, followed by tooling programs, must be done before production begins.

As a group of automobile engineers, with a hundred lifetimes of experience back of them, tussle with development problems, technical headaches always arise to plague their work. But it is to their everlasting credit that the problems, not the engineers, are licked.

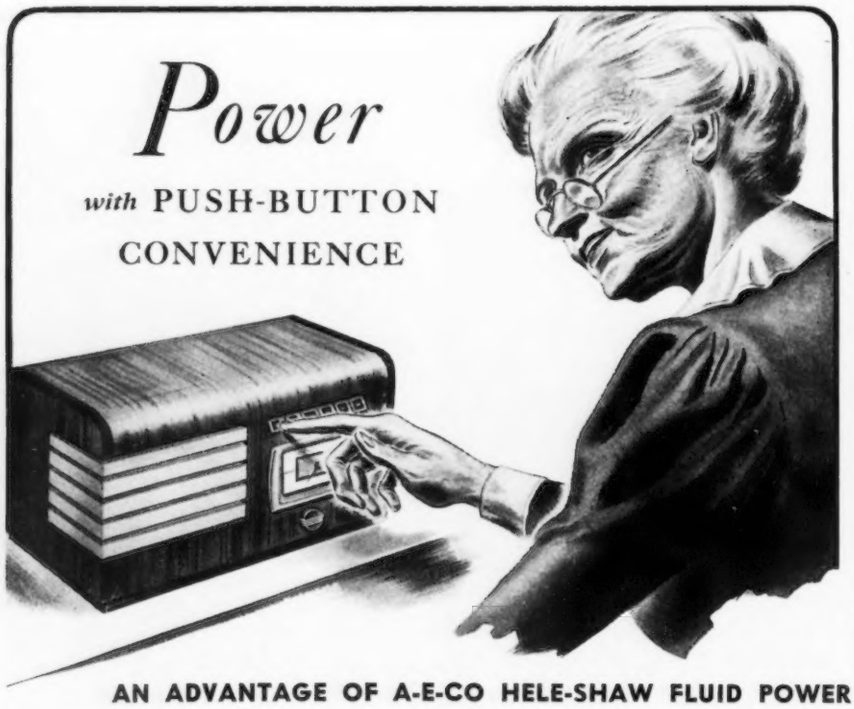
Of course, this stubborn engineering determination frequently means the loss of sleep, as William S. Knudsen will testify.

A few years ago, when Mr. Knudsen was running Chevrolet, it was decided that the forthcoming Chevrolet model was to have new fenders, made in one piece instead of several, and stamped out of wide sheet steel.

"We did have a little trouble," Mr. Knudsen relates, with magnificent understatement.

"I used to run back and forth to Flint when I was working on this. I would get up at 6 o'clock and drive to Flint, 60 miles away; then after working all day and half the night I would drive back home to sleep and then drive to Flint again the next morning. Well, anyhow, one day I thought I'd put on a show for the foreman. While engaged in the problem of adjusting the presses to the particular kind of material we had, I said to him: 'I think I'd better get myself a room up here, I'm sick and tired of running back and forth.'

" 'You don't need to get any room,' the foreman said. 'You can have mine, because I haven't been in it for a week'."



AN ADVANTAGE OF A-E-CO HELE-SHAW FLUID POWER

IF you don't already own a push-button radio you probably have a longing for one. We don't blame you. But remember, your own customers like push-button convenience, too, on machines you design or build. You can give it to them with Hele-Shaw Fluid Power (oil under pressure for driving machines).

Push a button and the Hele-Shaw Fluid Power Pump will start your machine on one or a complete cycle of automatically controlled operations. Push another button and it will stop or reverse. Changes in volume and direction of discharge can be made at the touch of a finger.

There's pressure—all you need—up to 3000 pounds per square inch, mechanical simplicity, thorough dependability, and usually a saving in power when you drive with Fluid Power. Nothing to oil because the Hele-Shaw Pump is self-lubricating.

Still, we've only scratched the surface of Fluid Power's advantages. Why not look at *all* of them before you design, build or buy machinery. Our own men, experienced in solving design problems hydraulically, are eager to help you.

A Hydraulic Pipe Testing Machine, driven by a Hele-Shaw Pump, has been in operation 11 years at The Seamless Tube Plant of Spang-Chalfont & Co., Inc., Ambridge, Penna. Although frequently operated for 24 hours at a time repair costs have been at a minimum.

A-E-CO HELE-SHAW *Fluid* POWER

AMERICAN ENGINEERING COMPANY
2410 ARAMINGO AVENUE, PHILADELPHIA, PA.
Other A-E-CO Products: La-Hed Hoists, Taylor Stokers, Marine Deck Auxiliaries.

Third of Machine Tools Reported Made in Ohio

• • • **Nearly one-third** of the nation's machine tools are produced in Ohio, the value of its output exceeding the combined total of the next three states (Connecticut, Illinois and Massachusetts), according to Ohio State University's business research bureau. Ohio has 69 machine tool companies, employing 14,527 employees, compared with a total of 60 such companies in 1933.

United Engineering's Meeting Held in Pullman

• • • **United Engineering & Foundry Co.** directors, including George T. Ladd, president, were to meet July 23 in a Pullman car near Canton, Ohio, to take dividend action on the company's common and preferred stocks while on an inspection tour of the company's Ohio plants.

Westinghouse To Build $560,000 Ohio Warehouse

• • • **Westinghouse Electric & Manufacturing Co.** will build a $560,000 warehouse, bringing to $1,500,000 the cost of an expansion program now under way at its merchandising division headquarters plant in Mansfield, Ohio.

British Rise in Steel Prices is Third in War

London

• • • **Herbert Morrison,** British Minister of Supply, has made the new Control of Iron and Steel Order operative as from July 1. This order provides for a fresh schedule of maximum prices for iron and steel products consumed in the United Kingdom. The new prices represent additions of from 3s. 6d. to 9s. per ton for pig iron. 22s. 6d. to 27s. 6d. per ton for billets, with corresponding adjustments for other products.

This is the third general advance since the beginning of the war. Previous advances of £1 per ton were made on Nov. 1, 1939, and on Feb. 1, last, respectively, in connection with the establishment of a central fund for the purpose of meeting the additional costs arising from importations of raw and semi-finished materials under war conditions.

Conditions abroad make it necessary further to strengthen the central fund for the purpose of meeting the cost of additional imports of steel. This charge, together with the increase in scrap prices under the Control Order in April and again in May, and in railroad rates as from May 1, accounts for approximately £1 per ton out of the advances in finished steel now scheduled.

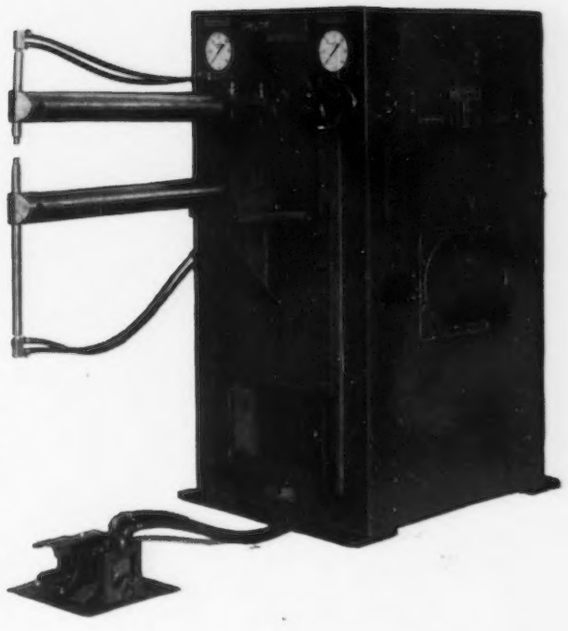
The above table shows a selection of the new basic prices for pig iron and steel.

In making the new adjustments special consideration has been given to the question of pig iron in integrated plants. Although integrated producers have suffered some advance in absolute costs their position has been relatively more favorable than that of other producers. This has been allowed for. For example, basic pig iron rates have been advanced by 9s. per ton, but only 6s. of this has been carried through to the steel price, so that integrated producers will be getting only 6s. more for pig.

Pig Iron (per ton)

	£	S	D				
Basic (d/d N. E. Coast)	5	13	0				
Hematite (N. E. Coast) No. 1	6	11	0				
Semis (per ton)—							
Soft billets	10	10	0	to	10	15	0
Hard billets, 0.42 p.c. to 0.60 p.c.	11	17	6				
Steel Products (per ton)							
Plates (d/d N. E. Coast)	14	3	0				
Chequered plates (¼-in. and up)	15	13	0				
Rails (heavy) f.o.b. works	12	15	0				
Tinplate—							
Coke quality, per basis box (20 by 14)	1	6	0				

AW-36 SPOT WELDER



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TAYLOR WINFIELD

Here is a spot welder primarily designed for welding aluminum alloys in the aircraft industry.

An important requirement is the elimination of hammer blow effect by the electrode. This demands the smallest point opening which is accomplished through a retractable stroke cylinder providing adjustable point opening from 0″ to 6″.

With the transformer and lower horn support mounted on a common member, it is unnecessary to disturb secondary connections for making vertical horn adjustments.

This conventional type of spot welder supplements the exclusive line of TAYLOR-WINFIELD HI-WAVE welders, thus making the most complete and diversified line of spot welders available in the world today.

The TAYLOR WINFIELD Corporation
WARREN, OHIO, U.S.A.

MANUFACTURERS OF ELECTRIC, BUTT SPOT AND SEAM WELDERS

REPRESENTATIVES IN ALL PRINCIPAL CITIES

TAYLOR-WINFIELD WELDERS ARE MANUFACTURED AND SOLD IN EUROPE BY AB. ASEA SVETSMASKINER, STOCKHOLM, SWEDEN, AND IN CANADA BY COMMONWEALTH ELECTRIC CORPORATION, LTD., WELLAND, WALKERVILLE, TORONTO, AND MONTREAL.

Government Prepares for Priority System, Watches Price Movements

Washington

••• **The national defense program** is shaping itself increasingly toward further government control of industry, ready to be made effective if held to be found necessary. The latest move in this direction was the setting up in the War Department last week of a system for establishing priorities on orders to guard against delayed deliveries and shortages. Under the plan preference would be given the War and Navy departments over domestic commercial and export orders.

A special committee, headed by Lieut.-Col. A. B. Johnson, was named to prepare a list of crucial materials, said to consist of major initial requirements. The committee was authorized to make recommendations which will be cleared through Donald M. Nelson, coordinator of defense purchases, National Defense Advisory Commission. Upon proclamation by the President the priority system could be applied and enforced.

It was stated that there is no early indication of effectuating a priority system. Nevertheless, it could be quickly put into effect and private industry will be made acquainted with the list of affected materials and urged to volunteer expeditious delivery, giving priority, if necessary, to the War and Navy departments over all other orders.

Meanwhile, the Advisory Commission's Division of Price Stabilization, headed by Leon Henderson, has announced that analysis of both the materials and resources has been coupled with consideration of measures for control and price stabilization. Mr. Henderson said that numerous proposals for price regulation are being studied. With Mr. Nelson, he pointed out, consideration is being given application from the viewpoint of impact on prices. Surveys are also being made by the division of the economic organization and controls within the belligerent countries.

Mr. Henderson explained that the primary effect of the division has been directed toward the determination of the effects of the rearmament program on the nation's price structure. A central Bureau of Research has been organized under the direction of Stacy May as a clearing house for information.

"Standards are being formulated to guide procurement agencies in connection with recent legislation authorizing negotiated contracts in lieu of competitive bidding," Mr. Henderson said,

"**The domestic price structure** is under constant surveillance. When price increases appear unjustified conferences have been held and will continue to be arranged.

"The complicated problems in-

• For two reasons that are vitally important to you . . . lower cost and better performance.

When you put ARMCO Stainless Steels to work in aircraft construction you get these highly desirable advantages:

1. Lower cost of materials.
2. Flexibility of design.
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4. High speed mass production through ease of spot welding.
5. Stainless steel requires no heat treatment during fabrication.

On the performance side, ARMCO Stainless Steels assure strength with light weight, ample rigidity, and resistance to heat and corrosion. These are features you want in airplane parts as well as structures.

Whether you make aircraft or products for home or industry, why not look into the profit, production and sales possibilities of ARMCO Stainless Steels? Let us work with you. Just write The American Rolling Mill Company, 2040 Curtis Street, Middletown, Ohio. District Offices in all principal cities.

ARMCO STAINLESS STEELS

volved in amortization for income tax purposes, as well as those inherent in government policy for lending through the RFC to expedite plant expansion, have occupied considerable time in this division. The whole problem of plant expansion is being studied in cooperation with Commissioners Knudsen and Stettinius as well as representatives of other government agencies involved."

The pressure for early adoption by Congress of an amortization plan grew as the War Department announced that it proposes to look to the aircraft industry to supply its needs for aircraft, adding that the same proposals are largely true with regard to the manufacture of munitions.

Announcement of the War Department that it does not contemplate erecting its own aircraft plants but proposes to rely on private industry, and to largely follow the same policy regarding plants for the manufacture of munitions, was made in response to a great volume of inquiries from civic authorities and organizations as well as commercial and industrial leaders in all parts of the nation suggesting that the War Department locate aircraft manufacturing plants in the various communities. The War Department has informed the inquirers that the sites suggested "will receive due consideration along with such others as may be available, should the establishment of installations by the War Department in the vicinities making the offer become necessary for defense expansion purposes." It was added that the location of any additional establishments that may be authorized will be based on strategical considerations.

The department made its announcement upon heels of signing a contract with the E. I. duPont de Nemours Co. for the construction of a smokeless powder plant near Charlestown, Ind. The plant will be owned by the federal government, which retained the duPont company to construct and operate it on a fixed fee basis. Some 4500 acres near Charlestown are being purchased as a site for the plant, which will cost approximately $25,000,000, and have a daily capacity of 200,000 lb. Construction will begin immediately and require about 10 months.

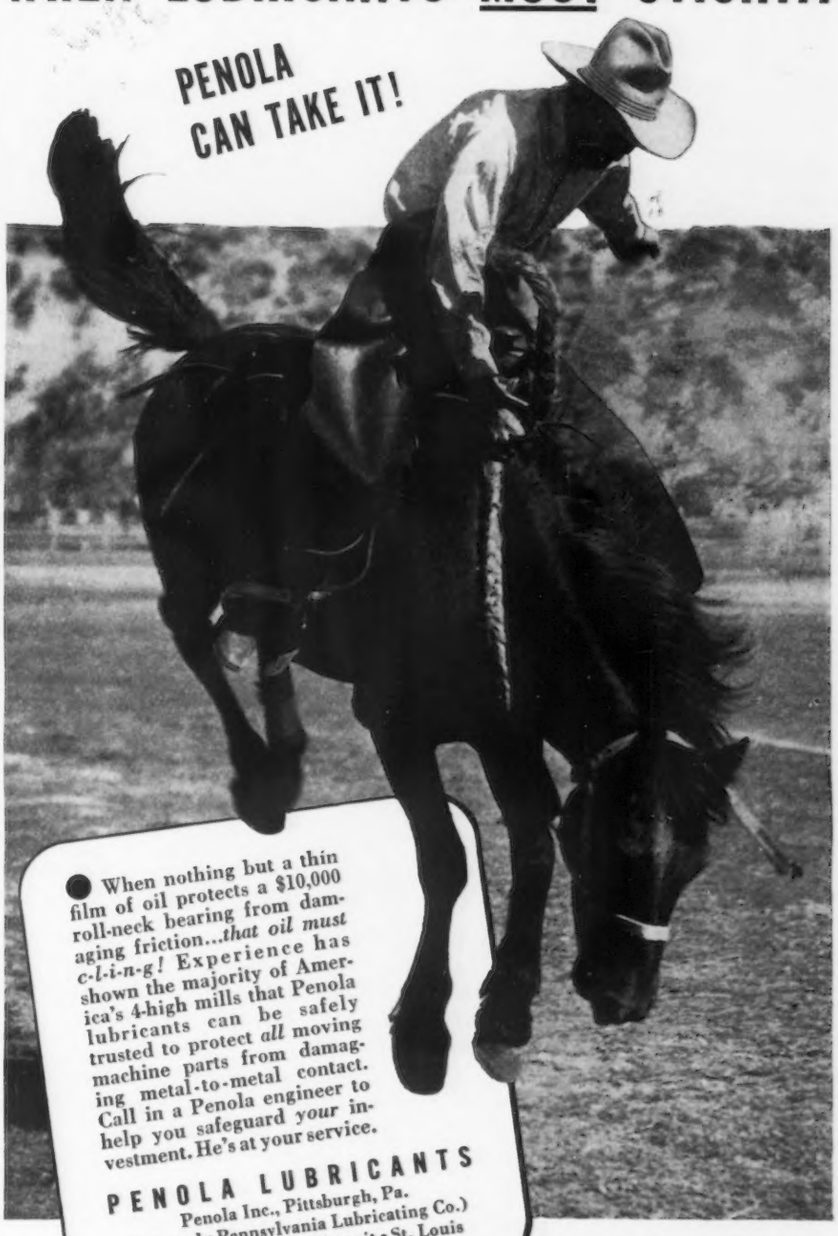
Conviction of Strikers In Wisconsin Upheld

Milwaukee

• • • **The Circuit Court** has upheld the final order of the Wisconsin Employment Relations Board in finding 14 union members involved in the Allen-Bradley Co. strike last August guilty of unfair practices by reason of threats made by them to other employees, of assaults committed by them upon other employees and of misdemeanors committed. The union had appealed the order, contending that it terminated the employee status of the 14 persons and was invalid because it violated the guarantees of employee relationship set up in the Federal labor relations law. This is the strike that resulted in the famous mass picketing ban by the State board.

WHEN LUBRICANTS MUST STICK...

PENOLA CAN TAKE IT!



When nothing but a thin film of oil protects a $10,000 roll-neck bearing from damaging friction...*that oil must c-l-i-n-g!* Experience has shown the majority of America's 4-high mills that Penola lubricants can be safely trusted to protect *all* moving machine parts from damaging metal-to-metal contact. Call in a Penola engineer to help you safeguard *your* investment. He's at your service.

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LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

John L. Lewis wants Blacklist of Wagner Act Violators

Washington

• • • **John L. Lewis,** CIO chairman and strong supporter of New Deal policies so long as they coincided with CIO objectives, last week sought to inject himself into the defense picture by sending word out that he is at odds with President Roosevelt over the latter's refusal to blacklist by executive order government contractors found guilty of violating the Wagner Act.

Irked over broadened powers given War and Navy departments to negotiate contracts without regard to the usual competitive bidding requirements and House refusal on three different occasions to blacklist Wagner Act violators, the CIO generalissimo urged his fellow board members in the CIO to renew efforts to crack down on "lawless corporations," advised members of the National Defense Advisory Commission to move in support of blacklisting violators; and made public correspondence in which he disagreed with Mr. Roosevelt over the legality of preventing Wagner Act violators from receiving further government contracts.

The CIO president persisted last week in his contention that there is a "firm legal basis" for the issuance of such an Executive order, and went so far as to draft the order which he wants the President to sign. Briefly, it is based on what the CIO chieftain calls the authority of the President to issue an order requiring guarantees of collective bargaining in government contracts, and would require all contracts to carry a covenant in which the contractor would agree to comply with any order of the NLRB. The National Defense Advisory Commission or other government contracting officer could cancel the contract upon certification by the labor board that its order had not been complied with.

For three years the CIO has sought to have the Congress or the Executive branch of government agree that corporations and individuals contracting with the government should stipulate that they will conform to the provisions of the National Labor Relations Act. Legislation to that end was passed by the Senate on three different occasions but each time it was killed in the House by a rebellious Rules Committee and by the Democratic leaders who resented the CIO's lobbying tactics.

SAVED every 10 months since 1930!

Eight of these HOWELL Type K *Totally-Enclosed, Fan-Cooled* Motors were installed in an automotive plant in 1930. They replaced eight ordinary open type motors which had cost $3450. in maintenance during the preceding ten months — eleven rewinds and 70 pairs of bearings.

To date — through ten years service — the eight HOWELL Motors have not required a single repair — not one cent spent for maintenance other than normal inspection and lubrication.

★ *As the first step toward cutting your drive costs, write for the HOWELL Bulletin covering the New Type K Motors—better than ever and STREAMLINED as shown above.*

1915 · 1940 HOWELL MOTORS 25th Anniversary Year

HOWELL ELECTRIC MOTORS COMPANY
HOWELL, MICHIGAN
Representatives in All Principal Cities

Blaw-Knox Orders For Quarter $4,850,204

Pittsburgh

Orders received by Blaw-Knox Co., for the quarter ended June 30 amounted to $4,850,204, compared with $3,368,324 in the corresponding 1939 quarter, an increase of 44 per cent.

Hudson Leads Field, Shipping 1941 Cars

Detroit

• • • **The news story** which — it was once threatened—would not break this year, has developed on schedule. It is the story of the announcement of 1941 automobile models which a few months ago were said by rumor to have been cancelled because of the defense program.

The automobile industry had an early start on production of 1941 models with Hudson in the lead when the new 1941 cars were announced July 18 by Hudson.

The new cars feature new body styling suggestive of the torpedo styling, longer wheel bases and interesting changes in color combinations.

Shipments of the new models have already been started, according to factory officials and dealers in 60 United States cities will hold preview meetings during the next two weeks.

• • • **Second announcement** of a preview of 1941 automobiles is that of the Plymouth division of Chrysler Corp. which has set Aug. 15 as the day for an advance showing of its 1941 models.

Warner & Swasey Co. Buys Additional Land

Cleveland

• • • **A second large** purchase of land has been made by the Warner & Swasey Co. adjoining its Carnegie Avenue plant.

Three large additions to the factory are under construction by the Sam W. Emerson Co. The latest purchase fronts 100 ft. on East 55th Street with an average depth of 450 ft. to the Pennsylvania Railroad right-of-way.

Steel Machinery Company Buys Cleveland Plant

Cleveland

• • • **The old Euclid** Foundry, idle for about 10 years, is reported being sold to the Broden Construction Co., manufacturer of steel mill machinery. F. J. Keller, secretary-treasurer of the firm, said his company hopes to begin rehabilitating the plant by Aug. 10. The plant contains about 20,000 sq. ft. of space.

National Broach to Expand, Buy New Tools

Detroit

• • • **National Broach & Machine** Co., 5600 St. Jean Avenue, Detroit, has announced a new expansion program entailing the purchase of about $150,000 worth of new machine tools. This is the fourth expansion in five years. It does not involve an addition to the plant that was greatly increased in size less than a year ago. The new equipment will be used to handle the current volume of orders and to produce the new Red Ring automatic precision profiling machine which the firm is introducing, according to J. I. Schultz, assistant treasurer and secretary.

Cincinnati

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When buying a modern planer check these features:

MAGNETIC DIAL FEEDS (Patented)
Individual for rail heads and side heads. Feeds selectable by 64ths from 1/64" to 1" with a twist of the wrist. Feeds may be changed at any position or direction of table travel. Heads may be fed at either end of table stroke.

STEEL TEE SLOT INSERTS (Patented)
Table Tee Slots are fitted with steel inserts so that lower edges will not be damaged by bolt heads. This construction prevents pulling out of tee slots insuring perfect condition of table throughout life of machine.

DOUBLE BRONZE NUTS
Used on all down feed and cross feed screws in all saddles and slides. This construction provides double life for all screw movements as all thrust and wear is taken by two nuts instead of one.

EXTENDED SADDLE AND HARP
To provide extra support for the slides along with an additional long-leverage bolt circle producing maximum rigidity between saddle and harp.

Examine the Hypro Openside Planer critically. Full particulars in our new Bulletin No. 110 sent free on written request.

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THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

Electric Furnace Steel Expansion May Lift Capacity 450,000 Tons

Expansion of electric furnace capacity for the manufacture of quality steels may be raised as much as 450,000 tons this year, instead of the 300,000 tons mentioned in THE IRON AGE last week. The higher figure would include capacity that was completed early this year before the national defense program was inaugurated. Details that have not hitherto been made public were revealed this week.

The Republic Steel Corp., it was announced by C. M. White, vice-president in charge of operations, will install two 50-ton electric furnaces at its works at Canton, Ohio. Installation will be started as soon as materials are received and necessary building alterations completed. Installation of new furnaces also means additional processing and finishing equipment.

The new furnaces will give Republic three electric furnaces of 50-ton capacity, one of that size having been put into operation recently, three of 25-ton capacity, three of 15-ton capacity and two of 6-ton capacity. Republic moved a 25-ton furnace recently from Buffalo to Canton.

No official estimate was given by Republic as to its total electric furnace steel capacity when contemplated expansion is completed, but the company undoubtedly will be in first position in the United States as a producer of electric furnace steel. At the beginning of this year Republic announced a total capacity of 190,000 net tons, at which time the Timken Roller Bearing Co. was in the lead with an annual capacity of 252,000 net tons.

Although the Bethlehem Steel Co. has made no official announcement regarding its electric furnace expansion, it is known that two furnaces of 56-ton capacity are being installed, which will give Bethlehem a total capacity of about 150,000 net tons. These new furnaces will be in operation by early fall and will make Bethlehem a much more important factor than hitherto in the alloy steel field.

The Crucible Steel Co. of America recently announced that it has completed installation of one 35-ton furnace at its Midland, Pa., works and was installing another of the same size.

Estimated increase in the total electric furnace capacity this year includes, of course, the new alloy steel plant of the Copperweld Steel Co. at Warren, Ohio, capacity of which is 100,000 tons or more annually.

As of Dec. 31, 1939, electric furnace melting capacity for steel ingots was estimated by the American Iron and Steel Institute at 1,592,080 net tons. Two years earlier—at the end of 1937—total capacity was 1,223,716 tons, an expansion of 368,364 tons in that period. This year's expansion probably will be the greatest the industry has experienced within a 12-month period.

Notwithstanding the fact that open hearth alloy steel has been successfully produced for some of the most severe of the government requirements, as for example for armor plate for Army tanks, there are many specifications which call for electric furnace steel exclusively; hence the present expansion is to take care of that demand, which will increase by leaps and bounds as the defense program gets fully under way.

The largest production of electric furnace alloy steel in any one year was 1,065,603 net tons in 1929, but this was closely approximated in 1939, when total production was 1,029,067 tons. Output of stainless steel ingots in 1939 was 179,620 tons.

Not all of the electric furnace melting capacity is used for alloy steels. For example, one of the largest capacities is that of the Northwestern Steel & Wire Co., Sterling, Ill., amounting to 201,600 net tons annually, which is used for the conversion of scrap into carbon steel ingots for the manufacture of wire products.

A considerable portion of the electric furnace capacity is owned by companies which make only tool steel, for which there will be a large demand.

The expansion of capacity is largely for alloy steels such as are used and will be used in the making of armor plate for tanks, steel for airplane parts, for the automobile industry and for machine tool builders. Stainless steel requirements are very heavy and will expand under the stimulus of the defense program, particularly Navy work.

Steel Profits Gain In Second Quarter

The high rate of operations which prevailed through a large part of the second quarter of the current year was reflected in the improved earnings reported by various steel making and working companies for the period.

Net profit of Republic Steel Corp. for the second quarter, after all deductions, amounted to $3,337,730, as compared with $3,111,723 in the preceding quarter. Company's half year profit amounted to $6,449,453, as against $1,083,311 in the six months ended June 30, 1939.

Jones & Laughlin Steel Corp.'s earnings in the second quarter were $2,141,645, as compared with a loss of $471,287 for the comparable period of 1939. For the half year, profit was $3,276,256, against a loss of $847,812 in the first half of 1939.

Tabulation below lists second-quarter earnings of various other companies.

Rustless Iron & Steel Corp.	332,754
Continental Steel Corp.	141,339
Sharon Steel Corp.	79,327
Truscon Steel Co.	344,187
Acme Steel Co.	661,150
Superior Steel Corp.	31,661
M. A. Hanna Co.	714,069
Interlake Iron Corp.*	147,190
Continental Roll & Steel Foundry Co.	236,156

*Loss.

Republic Steel Increases Buttweld Pipe Capacity

Youngstown

• • • **Republic Steel Corp.** is scheduled to begin operating its second continuous buttweld pipe mill here this week. The new unit, built by Aetna-Standard Engineering Co., is capable of welding pipe up to 4½ in., o.d., and will increase Republic's buttweld pipe output considerably.

A new strip coiler has been attached to the 19-in. mill at the bessemer plant to make possible the pipe mill.

Canada Speeds up War Industries Aided by Britain

Toronto

Canadian industry, particularly the steel branches, will be greatly augmented for production of shells, guns, tanks, motor vehicles, aircraft, etc., before the end of the year. Until such time as the primary steel producers in this country are in a position to provide larger quantities of finished and semi-finished steel, heavy imports from the United States will be necessary.

Alloy and armor plate are coming into greater demand due to construction of war tanks and ships and practically all these materials are being imported with big tonnage contracts to be placed at an early date. In addition to these special lines of steel, imports of such materials as plate, sheets, tinplate, etc., also have been coming into Canada at a record level since the beginning of the year.

Primary and secondary steel companies are going farther afield in their efforts to obtain raw materials. On this account it is reported that some 20,000 tons of special analysis pig iron has or will be imported into Canada from the United States in the course of the next few weeks, and it is reported that one large Toronto melter has purchased 5000 tons of cast scrap in Winnipeg and delivery has started.

Word from London, England, is that Britain will spend faster and more freely on war supplies in North America. Expenditure for Canadian made war materials, and to provide plants and facilities for their production in the Dominion will be sharply increased immediately. Hon. C. D. Howe, Minister of Munitions and Supply, Ottawa, stated that construction work will start immediately "somewhere in Ontario" on another major plant for the manufacture of chemicals for Canada's explosive manufacturing program. The new plant will cost $11,000,000.

Expansion of Canadian industry now taking shape under the direction of the Department of Munitions and Supply is designed to make this country independent of outside sources for weapons and munitions of war. As rapidly as possible plants are being put in shape to produce every type of weapon from the service rifle to the giant coastal defense and naval guns. Efforts are proceeding to create a full-fledged armament industry in the Dominion. These arrangements include doubling the capacity of the Bren gun plant and the establishment of other small arms plants, an enlarged program at a gun factory which has been working for some time on 25-pounder guns for the British government and establishment of other plants.

Announcement is made by the Department of Munitions and Supply, Ottawa, that more than 20 per cent of the 808 elementary training aircraft required for the Joint Air Training Plan have been delivered, and within the next few days production of these planes will be increased materially.

Preparations are now well advanced to speed the output of Hurricane fighters by Canadian Car & Foundry Co., Ltd., Montreal. The new plans represent very large expansion of the original orders from the British government and it is understood will eventually require a participation of one or two other aircraft producers in supplying parts. Canadian Car & Foundry also is said to be tooling up for the production of certain accessories, such as landing gear parts, tank treads and aircraft propellers.

Three new appointments were announced by Hon. C. D. Howe, Minister of Munitions and Supply, Ottawa. J. P. D. Malkin, formerly director of purchases of the department, has been appointed a member of the executive committee on which he will represent the general purchasing division of the department. John Eaton, assistant general purchasing agent of the Canadian Pacific Railway Co., on loan to the department, succeeds Mr. Malkin as director of purchases. L. L. Price, who formerly headed the machinery purchasing section, has been appointed general purchasing agent.

Department of Munitions and Supply, Ottawa, for the past week placed 1029 contracts having total value of $3,556,823. While most of the business was placed with Canadian firms, upward of $500,000 in orders were awarded to producers in the United States.

Warner & Swasey Co. to Sell Stock to Public

Cleveland

• • • **The Warner & Swasey Co.** since its formation 60 years ago as a privately owned enterprise and a principal manufacturer of precision machine tools employed extensively in the metal-working industry, including the manufacture of aviation and other military equipment, will become a corporation with a substantial public ownership if plans announced today to recapitalize the company and thus provide a public market for its closely held securities, are adopted at a special meeting of the stockholders called for Aug. 20 in Cleveland.

According to Charles J. Stilwell, it is proposed to increase the common stock for an authorized 300,000 shares of $5 par value to 1,000,000 shares without par value and to change each share of $5 par value common stock into three new shares without par value.

They are presently 248,245 shares of $5 par value common stock outstanding.

Defense Commission Names A Housing Coordinator

Washington

• • • **Charles F. Palmer** of Atlanta has been appointed housing coordinator for the National Defense Advisory Commission. His duties will involve the expedition of housing developments which may be undertaken in connection with defense activities, particularly where plant expansion may create pressing needs for new or addi tional housing facilities.

Mr. Palmer will work with existing government housing agencies to the end that their various services may be efficiently employed through cordination of effort.

Government Contracts

Washington

• • • **Federal contracts** for iron and steel products, as reported for the week ended July 13 by the Labor Department's Public Contract's Division, totaled $2,263,-682. For the same period contracts aggregated $464,854 for non-ferrous metals and alloys; and $776,-326 for machinery. Details follow:

Iron and Steel Products

American Bridge Co., Denver, and Ambridge, Pa., radial gates, $42,580; Pacific Wire Rope Co., Los Angeles, wire rope, $10,080; Pullman-Standard Car Mfg. Co., Pittsburgh, forgings for shell, $81,990.80; Pullman-Standard Car Mfg. Co., Pittsburgh, machined shell, $171,997; National Stamping Co., Detroit, angletubes, $14,850; American Bridge Co., Denver, and Gary, Ind., bulkhead gate, $34,615; Pittsburgh Steel Co., Pittsburgh, chain-link fence, $36,454.44; Lake Washington Shipyards, Houghton, Wash., tank baulks, $394,250; Greenville Steel Car Co., Greenville, Pa., buoys, $42,750.45; Allegheny Ludlum Steel Corp., Watervliet, N. Y., steel rods, $60,730.54; Universal-Cyclops Steel Corp., Bridgeville, Pa., steel rods, $61,262.76; Reeves Steel & Mfg. Co., Dover, Ohio, buckets, cans, $14,226.25; Steacy-Schmidt Mfg. Co., York, Pa., material for locking devices, $17,573; United States Pipe & Foundry Co., Philadelphia, cast iron pipe, $77,750; Western Pipe & Steel Co. of Cal., Los Angeles, outlet pipes, $47,875; Bethlehem Steel Co., San Francisco, reinforcement bars, $11,025; John A. Roebling's Sons Co., Trenton, N. J., wire cloth, $21,267.60; J. C. Pitman & Sons, Inc., Lynn, Mass., deep fat fryers, indefinite; Doehler Die Casting Co., Pottstown, Pa., die castings, $50,087.50; Joseph T. Ryerson & Son, Inc., Cambridge, Mass., sheet steel, $22,277.62; Stupp Brothers Bridge & Iron Co., St. Louis, bridge parts, $24,320; Decatur Iron & Steel Co., Decatur, Ala., structural steel, $35,000; Sheffield Steel Corp., Kansas City, Mo., reinforcing bars, $12,972.31; Struthers Wells-Titusville Corp., Titusville Forge Div., Titusville, Pa., breech rings, $23,156; Worden-Allen Co., Milwaukee, sectional steel buildings, $106,478.50; Columbiana Boiler Co., Columbiana, Ohio, chemical containers, $368,000; American Welding Co., New York, chemical containers, $186,000; Republic Steel Corp., Cleveland, U-bolts saddles, $36,294.50; National Tube Co., Ellwood City, Pa., boiler tubes, $17,-332.91; John A. Roebling's Sons Co., Trenton, wire rope, $66,339.50; Pacific Wire Rope Co., Los Angeles, wire rope, $33,254.99; Walter Kidde & Co., Inc., New York City, steel cylinders, $15,051.87; Edwards Mfg Co., Cincinnati, practice bombs, $53,100; Merit Supply Co., Inc., New York, chock assemblies, $31,248; Ohio Pattern Works & Foundry Co., Cincinnati; Wadell Engineering Co., Newark, N. J., maintenance equipment, $41,490.80.

Machinery

Bay City Shovels, Inc., Bay City, Mich., shovel, $13,750; Caterpillar Tractor Co., Peoria, Ill., tractor-crane, $11,202.36; Silent Hoist Winch & Crane Co., Brooklyn, N. Y.; G. A. Gray Co., Cincinnati, planer, $21,040; Gleason Works, Rochester, N. Y., gear cutting machine, $17,984; Kearney & Trecker Corp., Milwaukee, threading machines, $49,000; Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., tool room machine, $13,745; Kearney & Trecker Corp.; Milwaukee, millers, $15,859; Insinger Machine Co., Philadelphia, washing machines, $11,625; Farrel - Birmingham Co., Inc., Ansonia, Conn., rolling mill unit, $23,-396; Brown & Sharpe Mfg. Co., Providence, R. I., milling machines, $23,516; Northwest Engineering Co., Chicago, shovels, $43,600; Brown & Sharpe Mfg. Co., Providence, R. I., milling machines, $44,175; Carrier Corp., New York, refrigerating plants, $51,232; Monarch Machine Tool Co., Sidney, Ohio, lathes, $54,681; Drier Co., Chicago, laundry machinery, $12,-545; Schutte & Koerting Co., Philadelphia oil pumps, $14,565; Westinghouse Electric & Mfg. Co., East Pittsburgh; Universal Stamping Machine Co., Stamford, Conn., cancelling machines, indefinite; Brown & Sharpe Mfg. Co., Providence, R. I., milling machines, $13,740; The Austin-Western Road Machinery Co., Aurora, Ill., machinery parts, indefinite; Northwest Engineering Co., Chicago, power shovel, $12,852; Caterpillar Tractor Co., Peoria, Ill., tractors, $24,635; E. A. Kinsey Co., Cincinnati, milling machines, $25,917; Kay Products Co., Detroit, engine hoists, $31,800; Yale & Towne Mfg. Co., Stamford, Conn., fuel servicing pumps, $122,629; Roseman Tractor Mower Co., Evanston, Ill., lawn mowers, $26,445; Harris Seybold Potter Co., Cleveland, lithographic press, $14,850; American Type Founders Sales Corp., Washington, D. C., lithographic presses, $22,676; Wallace & Tiernan Co.., Inc., Newark, water purification units, $32,-610; Barber-Greene Co., Aurora, Ill., paving machine, $10,554.50; B. Jahn Mfg. Co., New Britain, Conn., cutting machines, $15,700.

Walsh-Healey Wage Order Applies to Armor Plate

Washington

• • • **Sources close** to the agency administering the Walsh-Healey Public Contracts Act expressed doubt this week that any deviation would be made in an interpretation issued on May 28 which specifically brought armor plate under the provisions of the Walsh-Healey steel wage order. It was understood, however, that officials of the Labor Department's public contracts division have taken under advisement a further interpretation requested by a government department and the Midvale Co., Philadelphia.

When the court order, which had permitted steel companies to bid on government business without regard to the steel wage determination, was vacated on May 28, the public contracts division advised all government purchasing departments that the steel wage order had been interpreted as specifically including armor plate, galvanized strips, sheets, plates and galvanized structural shapes among the steel products whose manufacturers were to be subject to minimum wage rates determined by the Secretary of Labor for firms doing government business.

At that time it was explained that it was the intention to include armor plate in the original steel wage order but that it was now being specifically covered so as to remove all doubt concerning the original order.

Stettinius Names Aid On Leather Belting, Etc.

Washington

• • • **Edward R. Stettinius, Jr.,** member of the National Defense Advisory Commission in charge of the Raw Materials Division, on Monday announced the following appointments to his staff:

Henry M. McAdoo, president, United States Leather Co., New York, to be group executive on leather, industrial belting and related products.

Merrill A. Watson, executive vice-president, Tanners Council of America, Inc., New York, to be an assistant to Mr. McAdoo.

John W. Watzek, Jr., of Chicago, is to be group executive on lumber and lumber products.

• **Allen W. Williams** has retired as managing director and treasurer of the National Warm Air Heating and Air Conditioning Association, Columbus, after 27 years' of service. He was one of the founders of the association and will continue in an advisory capacity. Mr. Williams continues as secretary and treasurer of the National Warm Air Register Manufacturers Institute, a position he has held for many years. He has been succeeded in his former post by **George Boeddener,** recently assistant to the president of the National Warm Air Association.

• **R. N. Blakeslee, Jr.,** who has been secretary and sales manager of the Ajax Electrothermic Corp., Trenton, N. J., has been elected vice-president and assistant general manager. **A. D. Meyer** has been made treasurer and **F. T. Chestnut,** secretary.

• **Howard R. Salisbury,** for the past six years assistant manager at Philadelphia for the Air Reduction Co., New York, has been appointed manager of that office, succeeding **William W. Barnes,** who retired recently. Mr. Salisbury has been connected with the company for 15 years. **H. B. Seydel,** formerly assistant sales manager of the New York district, has been appointed assistant manager at Philadelphia.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **G. V. Patrick,** since 1935 Eastern sales manager at New York for Cleveland Automatic Machine Co., Cleveland, has been made director of sales with headquarters at Cleveland. Mr. Patrick, a graduate of Massachusetts Institute of Technology, started with the company in 1928 in Cleveland. From 1932 to 1935 he was employed elsewhere. **H. A. Gray** becomes Eastern sales manager at New York, succeeding Mr. Patrick. He went with Cleveland Automatic several months ago following extended service with the government, including experience in the ordnance department. Another change by Cleveland Automatic Machine Co. is the establishment of a permanent office in Cincinnati. **F. C. Reese** is the new district manager there. He joined the company several months ago after service with Cincinnati Milling Machine Co. as a sales engineer.

• **W. Leslie Lawrence** has been elected secretary of the Alexander Milburn Co., Baltimore. He filled various positions with the company, first as Baltimore representative, then in the sales department and a short time ago became one of the company's directors. Mr. Lawrence succeeds the late Harvey H. Johnson.

• **George Schneider** has been made manager of the newly reorganized heating and ventilating division of Milcor Steel Co., Milwaukee. He has been identified with the company for the past 20 years.

• **C. O. Bartlett,** for some time associated with the American Agricultural Chemical Co., as manager of its gelatin division, has been appointed Detroit district manager of the C. O. Bartlett & Snow Co., Cleveland, which was founded by his father. Mr. Bartlett served in the engineering and erection departments of the company after his graduation from

HOWARD R. SALISBURY, new Philadelphia manager of Air Reduction Co.

G. V. PATRICK, director of sales of Cleveland Automatic Machine Co.

C. O. BARTLETT, Detroit district manager of C. O. Bartlett & Snow Co.

Case School of Applied Science in 1916.

• **J. Eugene Jackson,** for the past nine years identified with the Chase Brass & Copper Co., Cleveland, has been appointed metallurgical engineer for the Copper Iron and Steel Development Association, Cleveland. He will act as technical service representative. Mr. Jackson attended the University of Texas and Case School of Applied Science and is a member of the American Society for Metals and American Foundrymen's Association.

• **W. A. Morris, Jr.,** has been appointed assistant purchasing agent, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Morris has been connected with Jones & Laughlin for the past 15 years.

• **Theodore J. Kauffeld,** heretofore chairman of the board and managing director of Steelworks Design, Ltd., London, has returned to this country to become manager of the products division of American Type Founders, Inc., Elizabeth, N. J. He was formerly identified with the DeLaval Separator Co., in its Pittsburgh office.

• **Robert I. Petrie,** for the past two years president and general manager of the Barlow & Seelig Mfg. Co., Ripon, Wis., has been made vice-president and general sales manager of the Crosley Corp., Cincinnati.

• **Herbert G. Simmons** has been made manager of the Kokomo Nail & Brad Co., Kokomo. Ind., succeeding the late Ross Waggaman.

• **Col. James A. Brooks,** commanding officer of an ordnance school for noncommissioned officers at the Raritan, N. J., arsenal, has been made an executive administrative officer, third in command, at the Springfield, Mass., armory.

• **Dr. A. A. Potter,** dean of the schools of engineering and director of the engineering experiment station at Purdue University, has been awarded the Lamme medal for 1940 by the Society for the Promotion of Engineering Education, for "his many achievements in the advancement of engineering education and its application to industry."

• **H. H. Krause,** associated for 20 years with the National Screw & Mfg. Co., Cleveland, has been appointed purchasing agent of the Pump Engineering Service Corp.,

H. H. KRAUSE, purchasing agent of Pump Engineering Service Corp.

national manufacturer of aircraft pumps, also of Cleveland.

• **J. Russell Penman** has been made production manager of the new alloy steel plant in Warren, Ohio, of the Copperweld Steel Co., Glassport, Pa. Mr. Penman was previously connected with Central Steel Co., Republic Steel Corp., and Steel & Tube Division of Timken Roller Bearing Co.

• **C. M. Weaver,** formerly superintendent of maintenance for United Air Lines, has joined the staff of the manufacturing department of Boening Aircraft Co., Seattle. He began his connection with aviation as a mechanic for the air mail service of the Post Office Department in 1924.

• **Professor John D. Akerman,** head of the Department of Aeronautical Engineering, University of Minnesota, has been retained by the Boening Airplane Co., Seattle, for a three-month period this summer as a consultant in connection with the company's aircraft research program.

Obituary

• **Charles A. Goodspeed**, of Madison, Conn., who was connected with Henry Prentiss & Co., New York, for 40 years previous to his retirement in 1928, died in a New Haven, Conn., hospital on July 15, aged 72 years.

• **Ross Waggaman,** manager and assistant treasurer of the Kokomo Nail & Brad Co., Kokomo, Ind., died of heart diease at his home in that city on July 3, aged 67 years. He had been associated with the company and its predecessors for almost 50 years.

• **Shindel G. Case,** district representative of the Phoenix Iron Co., at Albany, N. Y., died suddenly on July 16 at Rutland, Vt., while on a business trip. He was 62 years old and had been in the employ of Phoenix for 40 years.

• **Fred J. Waldo,** president of Waldo & Maltby, Inc., East Aurora, N. Y., died in Buffalo General Hospital on July 12 after a short illness. He was 55 years old. He had been connected with the pig iron, coke and coal business for 35 years, having been identified with Rogers, Brown & Co., as senior salesman for 17 years before founding his own firm.

• **Capt. Eddy P. Rogers,** vice-president of the Excelsior Foundry Co., Belleville, Ill., died at his summer home in South Haven, Mich., where he had been since last May on account of ill health. He was 80 years old.

• **W. C. Martin,** president of the Vulcan Rivet & Bolt Corp., Tarrant, Ala., died on July 18 at his Birmingham home after a long illness. Mr. Martin was a former chief engineer of Woodward Iron Co. and helped organize the Superior Pipe Co. of Bessemer, Ala. At the beginning of the World War he was commissioned captain and put in charge of the Edgewood Arsenal construction.

• **Harry T. Smith,** traffic manager of Worthington Pump & Machinery Corp., Harrison, N. J., died at his home on July 3. He had been identified with the corporation for 54 years.

Metal Working Activity

. . . Latest Data Assembled by The Iron Age
From Recognized Sources. In Net Tons.

	June 1940	May 1940	June 1939	5 Months 1940	5 Months 1939
Steel Ingots:					
Monthly output[a]	5,426,771	4,841,403	3,523,880	18,303,811	14,139,679
Average weekly output[a]	1,289,723	1,092,867	821,417	1,058,635	824,471
Per cent of capacity[a]	84.97	72.00	53.71	69.75	53.91
Pig Iron:					
Monthly output[b]	3,818,897	3,513,683	2,372,665	17,264,703	11,652.388
Raw Materials:					
Coke output[c]	.....	4,349,909	3,141,521	21,813,914	15,456,042
Lake ore consumed[d]	5,212,699	5,114,144	3,169,227	24,774,363	15,838,165
Castings:					
Malleable, orders[e]	.....	35,563	29,041	181,922	164,221
Steel, orders[e]	.....	.....	37,774	.....	192,382
Finished Steel:					
Trackwork shipments[a]	6,075	7,276	6,832	37,036	27,117
Fabricated shape orders[f]	.....	117,789	111,594	493,785	529,051
Fabricated plate orders[e]	.....	40,408	33,959	171,684	143,078
U. S. Steel Corp. shipments[g]	1,209,684	1,084,057	807,562	6,288,398	1,449,994
Fabricated Products:					
Automobile production[h]	.....	391,215	309,738	2,083,892	1,652,251
Steel furniture shipments[e]	.....	$2,102,426	$1,714,126	$11,062,756	$8,792,804
Steel boiler orders[e] (sq. ft.)	.....	1,065,958	1,032,339	3,797,448	4,206,754
Locomotives ordered[i]	.....	2,081	1,324	6,350	7,753
Freight cars ordered[i]	.....	20	8	156	144
Machine tool index[j]	92.3	92.5	65.5	33.1†	61.2†
††Foundry equipment index[k]	164.9	129.1	101.4	152.5	100.8
Gear sales index[s]	129.0	133.0	90.0	123.0†	92.0†
Non-Ferrous Metals: (U. S. only)					
Lead shipments[l]	.....	.....	38,710	.....	193,508
Lead stocks[l]	.....	.....	129,636	.....	.....
Zinc shipments[m]	53,518	59,177	37,284	267,849	208,006
Zinc stocks[m]	70,673	75,036	135,241	.....	.....
Tin deliveries[n] (gross tons)	9,225	7,905	4,925	41,384	25,075
Refined copper deliveries[o]	61,716	69,467	53,573	357,151	243,838
Refined copper stocks[o]	199,586	178,664	335,012	.....	.....
Exports: (gross tons)					
Total iron and steel[p]	.....	783,964	588,856	3,315,672	2,123,371
All rolled and finished steel[p]	.....	272,180	159,188	1,470,524	1,410,728
Semi-finished steel[p]	.....	154,849	13,227	517,679	57,785
Scrap[p]	.....	312,483	397,321	1,162,736	1,390,064
Imports: (gross tons)					
Total iron and steel[p]	.....	8,582	32,587	35,366	144,407
Pig iron[p]	.....	317	4,276	5,132	11,578
All rolled and finished steel[p]	.....	566	16,050	6,321	82,831

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary estimates by THE IRON AGE—Final figures from Bureau of the Census, U. S. only; [i] *Railway Age;* [j] National Machine Tool Builders Association; [k] Foundry Equipment Manufacturers Association; [l] American Bureau of Metal Statistics; [m] American Zinc Institute; [n] New York Commodity Exchange; [o] Copper Institute; [p] Department of Commerce; [r] Institute of Scrap Iron and Steel; [s] American Gear Manufacturers Association.

†Three months' average. ††Method of computing index revised in May, 1940.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	July 23, 1940	July 16, 1940	June 25, 1940	July 25, 1939
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.40
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	1.92
Skelp (grvd)	1.90	1.90	1.90	1.90

	July 23, 1940	July 16, 1940	June 25, 1940	July 25, 1939
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese‡	120.00	120.00	120.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melting steel, P'gh.	*$18.50*	$19.00	$20.25	$15.75
Heavy melt'g steel, Phila.	18.75	18.75	20.00	15.75
Heavy melt'g Steel, Ch'go	*17.25*	17.375	18.50	13.875
Carwheels, Chicago	19.00	19.00	19.00	12.75
Carwheels, Philadelphia	20.75	20.75	22.75	16.00
No. 1 cast, Pittsburgh	19.75	19.75	20.75	15.25
No. 1 cast, Philadelphia	21.25	21.25	22.25	16.75
No. 1 cast, Ch'go (net ton)	16.75	16.75	17.25	12.75
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$4.25	$4.25	$4.00	$3.75
Foundry coke, prompt	5.25	5.25	5.25	4.75
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	11.50	11.50	11.50	10.31
Copper, Lake, New York	11.50	11.50	11.50	10.375
Tin (Straits), New York	*51.125*	51.25	52.25	48.45
Zinc, East St. Louis	6.25	6.25	6.25	4.60
Lead, St. Louis	4.85	4.85	4.85	4.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 93 to 102 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 23, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$18.17 a Gross Ton
One week ago	**2.261c. a Lb.**	**$22.61 a Gross Ton**	**$18.38 a Gross Ton**
One month ago	2.261c. a Lb.	$22.61 a Gross Ton	$19.58 a Gross Ton
One year ago	**2.236c. a Lb.**	**$20.61 a Gross Ton**	**$15.13 a Gross Ton**

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1940	2.261c., Jan. 2	2.211c., Apr. 16			$19.92, June 18	$16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• National defense steel orders making themselves felt, though not yet in impressive volume . . . Bulge may come first in shapes, plates and piling. General run of buying has leveled off but large orders loom . . . Production at 1940 high of 89 per cent.

NATIONAL defense requirements, though not yet forming an impressive proportion of current steel orders, are beginning to make themselves felt, but to a greater extent in inquiries than in actual specifications.

The biggest bulge in orders within the near future, it now becomes apparent, will be in structural shapes, plates and sheet piling. Large tonnages are involved in current estimates for shipbuilding, dry docks, airplane bases and industrial plants required for the defense program. This week's awards of a little under 30,000 tons of fabricated structural steel do not begin to reflect the eventual requirements, many of which have not yet reached the formal inquiry stage.

Meanwhile deliveries on shapes have lengthened to periods ranging from three to five weeks, partly because a good deal of shell steel and sheet piling is being rolled on structural mills. Deliveries have also lengthened considerably on wide plates, in which a possible shortage is foreseen.

Heavy inquiries for shell steel billets and bars are also beginning to reach the mills. Some orders have been placed for ordnance work, for example 1000 tons of high carbon strip steel for cartridge clips and a sizable tonnage of cold rolled spheroidized strip for metallic belt links for machine guns.

WHILE the general run of commercial steel buying has leveled off this month to date, in some instances being below the corresponding June total, nearby future requirements for export, United States rearmament, railroad equipment rehabilitation and the automobile industry loom so large that production will undoubtedly be maintained at its present rate or higher for many months to come. Any slipping from the present production rate would be a temporary situation and of no significance.

The only qualification of this statement that is necessary is the bare possibility of early peace in Europe, a factor not lost sight of by the steel industry, as 10 per cent or more of current output is for the British. Export demand is, in fact, predominantly from Great Britain, though Japan has considerably increased its purchases in the past week, particularly in billets and wire rods.

A Japanese purchase of about 300,000 tons of steel scrap is not all new business since some old contracts were tied in with the recent orders. Government officials have been aware of this buying, but there appears to be no disposition in Washington at this time to apply the licensing provision of the May-Sheppard bill to scrap exports.

The price paid by the Japanese interests for No. 1 steel scrap is reported to have been a little above $17 a ton, whereas this week's IRON AGE steel scrap composite is $18.17, a decline of 21c. from last week. The export market, however, has been weakened by the accumulation of scrap that was awaiting shipment to Italy when that country entered the war.

PRODUCTION of steel ingots this week is estimated by THE IRON AGE at 89 per cent of the industry's capacity, a new 1940 high. If Bessemer capacity were being operated as fully as open hearth, the rate would be much higher. The Chicago district, at 96½ per cent, is at the highest point in nearly 11 years. Detroit capacity is 100 per cent employed, while the Wheeling-Weirton and southern Ohio districts are close behind at 99 per cent.

Substantial orders for steel are expected next month from the automobile industry, which is rapidly changing over to new model production and which is experiencing the most remarkable mid-summer expansion in sales in years. Retail sales have jumped from 100 to 200 per cent over those of last July. One explanation is higher motor car prices, some of which have been announced, and another is the possible fear of delayed deliveries if automobile companies become heavily engaged in defense work.

Railroad equipment buying promises to substantially aid steel orders. The week's purchases were 48 locomotives and 3550 freight cars, of which 3000 bought by the Illinois Central will take upward of 30,000 tons of steel. A substantial rail buying movement is in the making.

The Federal Government has set up the machinery for the establishment of official priorities in essential commodities, including steel, but the program probably will not be put into effect unless shortages or delays affecting the defense program become imminent. A list of crucial requirements will be compiled. For the present the War and Navy Departments will depend on voluntary preferences for their orders over domestic commercial and export orders. Studies of price regulation are also being made at Washington, but thus far the aim of the Administration has been to achieve price stabilization by the cooperation of industry.

The Industrial Pace . . .

CONTINUED drop in automobile assemblies is still holding THE IRON AGE index of capital goods activity below the level reached at the end of June before the holiday dip, although a slight gain of 0.7 points has been recorded over the revised figure of 82.6 for the week ended July 13. This condition prevails despite a gain of almost 10 points in the construction index as a result of a record breaking volume of heavy engineering awards. There were moderate gains in loadings of forest products, amplified in the index by going against a seasonal decline, and in the Pittsburgh factor. Although ingot operations were estimated the same as for the preceding week, correction for seasonal trends resulted in a decline of 2.3 points in the index factor.

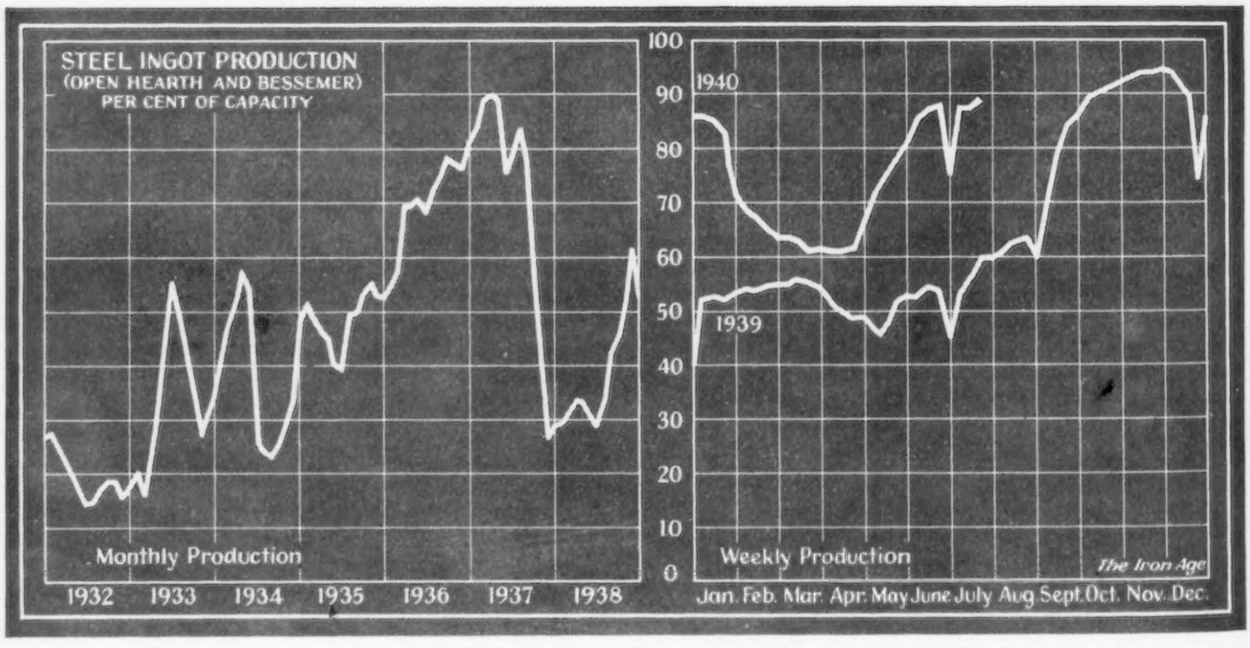
The sharp drop in the automotive index is accounted for by the fact that many companies have already ceased production of 1940 models and are now in the changeover period. Furthermore, because it is impossible to predict the time of model changing shutdowns in advance, seasonal correction factors of late years have generally been out of phase with the actual period of decline. Advancing of the changeover by several weeks this year has tended, therefore, to exaggerate the decline in the index.

On the other hand, the use in THE IRON AGE index of a 13-week moving average on heavy engineering construction awards has tended to subdue to a gain of 9.4 points, or 16 per cent, what amounted to a gain in actual dollar volume of 74 per cent over the preceding week. The total of $170,834,000 for the week ended July 20 was the best week's volume since March, 1930, when a high of $181,886,000 was reached. Awards for week ending July 13 had amounted to $98,039,000, previous record for the year, and compared with a weekly average of $63,191,000 for the four weeks of June. Defense construction was almost entirely responsible for the record breaking gain of last week, since private construction actually showed a drop of 59 per cent from the preceding week. Of the total volume, $130,736,000 represents work for the federal Government, including $30,000,000 for a smokeless powder plant, and other amounts for shipways, ammunition and fuel storage facilities, barracks, machine shop extensions and power plant improvements at navy yards and air bases. The figure of $170,834,000 does not include defense construction in United States possessions amounting to an additional $47,000,000. Federal construction for the week was 6900 per cent over the figure of a year ago and 350 per cent over the preceding week.

In the chart, the drop in June of monthly heavy construction activity is largely accounted for by the fact that the total is for four weeks, whereas the May figure is the accumulation of five weeks.

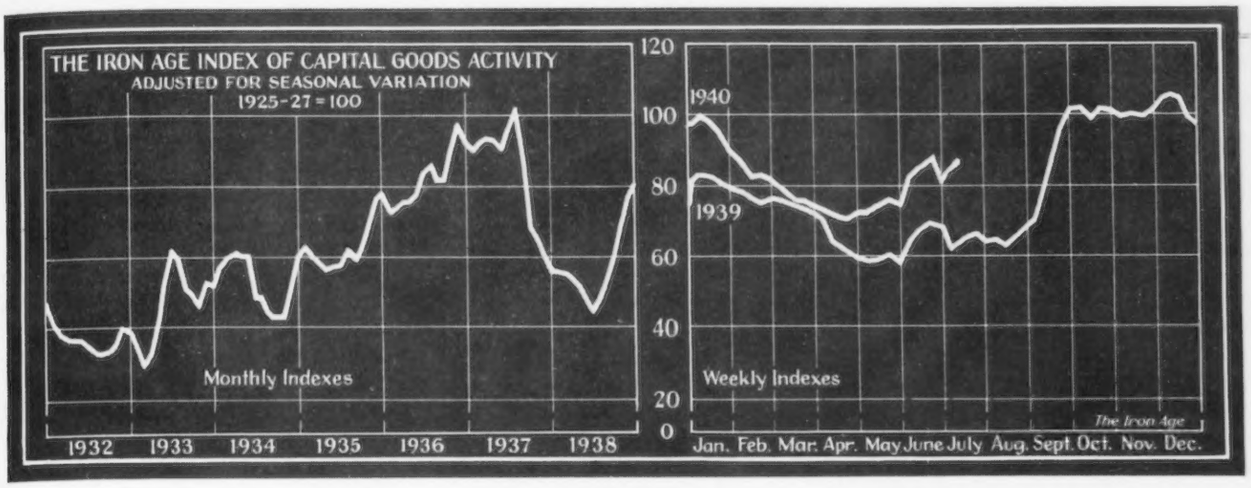
According to the Bureau of Labor Statistics, strengthening prices for pig tin and ferromanganese were largely responsible for the 0.1 point increase in the wholesale price index of metals and metal products, from 94.8, the index number that had prevailed for the last two weeks of June, to 94.9 for the week ended July 6. The figure was unchanged for the week ended July 13.

Ingot Rate Rises One and One-Half Points to 89% of Capacity



District Ingot Production, Per Cent of Capacity		Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
	Current Week	85.0	96.5	87.0	90.0	68.0	100.0	99.0	100.0	96.0	99.0	65.0	76.5	75.0	89.0
	Previous Week	83.0	94.5	88.0	88.0	66.0	100.0	99.0	95.5	96.0	96.0	65.0	76.5	75.0	87.5

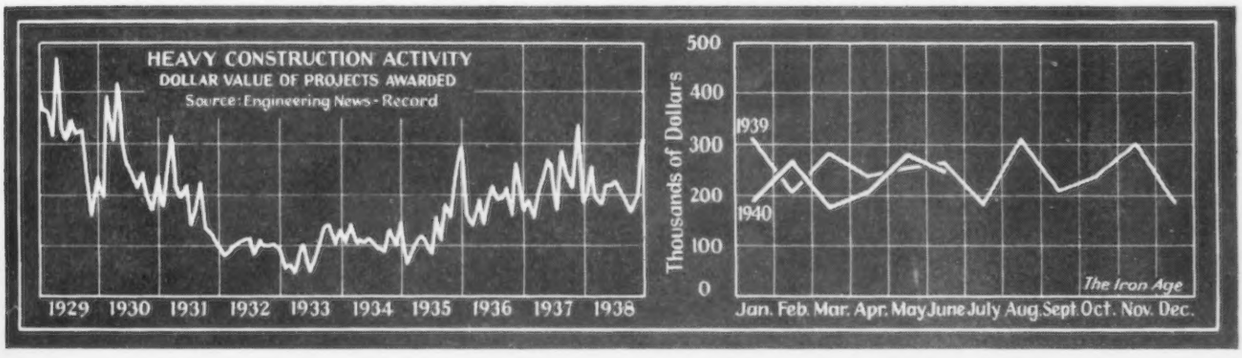
Capital Goods Index Still Below Pre-Holiday Level



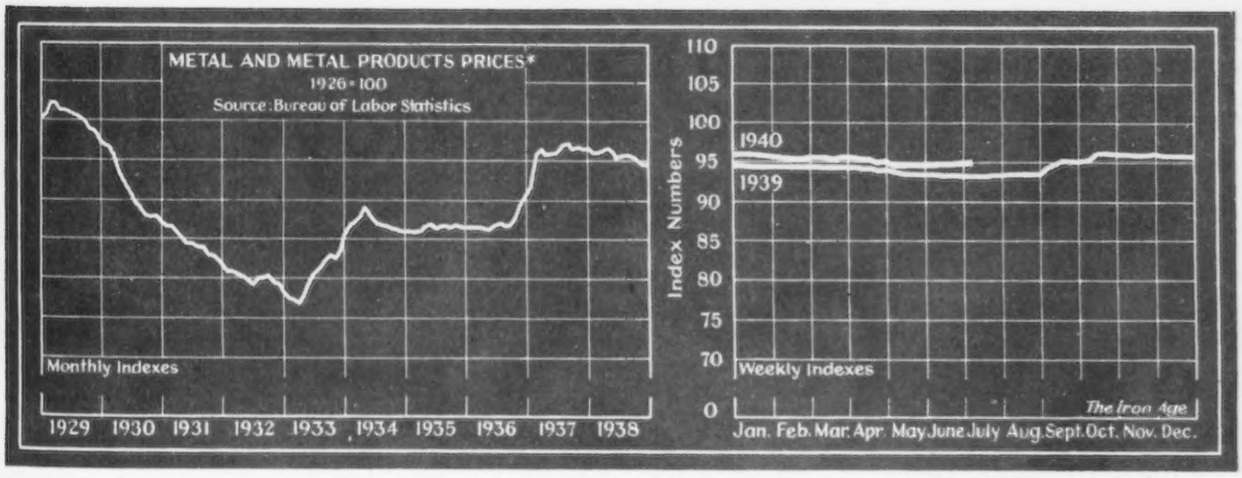
▼Component Week Ended ➤	July 20	July 13	June 22	July 22 1939	July 20 1929
Steel ingot production[1]	125.8	128.1	126.9	81.8	141.4
Automobile production[2]	53.5	62.9*	82.0	47.9	127.2
Construction contracts[3]	69.2	59.8	58.6	59.3	121.4
Forest products carloadings[4]	59.6	55.9	61.2	74.3	125.0
Pittsburgh output and shipments[5]	108.7	106.3	101.8	67.7	131.0
COMBINED INDEX	83.3	82.6*	86.1	66.2	129.2

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record;* [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended July 13. Other indexes cover week of July 20. *Revised.

June Engineering Construction Off from May Peak



Cost of Metal Products Virtually Unchanged for Two Months



* Based on 147 items, including iron, steel, non-ferrous metals and finished products such as agricultural equipment, automobiles, tools, bolts, etc.

Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . A More Leisurely Pace in Steel Ordering is Apparent

Although total bookings at PITTSBURGH in the past week were not up to the volume of a week ago, steel makers do not interpret this showing as indicating a definite trend. Domestic demand has been fluctuating in the past two weeks but not enough time has elapsed to definitely tell whether these irregularities portend a falling off in domestic requirements. Some of this loss has been more than made up by export requirtments from Great Britain. Furthermore, within the past week demand from Japan has stepped up considerably and a slow but steady increase is noted in South American orders.

Meanwhile, PITTSBURGH producers are looking forward to railroad, automobile, and government buying to keep the rate of incoming business at recent levels or to even bring further improvement. It is generally agreed, however, that a sudden peace or defeat for the British would have marked repercussions in the steel trade and would most likely result in a sharp decline in both business and operations which would continue until United States armament program got under way on a large scale.

At CHICAGO domestic steel orders have assumed a more leisurely pace, with sales generally running behind a month ago. Volume is still seen by leading interests as sufficient to warrant continued capacity operations, however, while demand is expected to be bolstered late this month or early next by the resumption of automobile production. Meantime, district ingot production has attained a new high of 96½ per cent of capacity, best mark in almost 11 years.

Export demand for steel, which is largely of British origin, shows no slackening.

Easing of the order rate is being attributed to seasonal factors such as inventory and vacation periods at many plants. One effect is a measure of improvement in delivery schedules on a number of products.

Though backlogs of Chicago mills have grown to volume proportions, there still is a feeling on the part of some producers that a number of customers are not sufficiently covered for future needs. Many of these, however, are among the interests entering orders today. Users of the heaviest steel products are accounting for the bulk of demand.

While the daily average of new domestic business at CLEVELAND up to July 20 has been lighter than in the comparable part of June, foreign business has enabled aggregate orders to exceed productive capacity. Export demand is predominantly from Great Britain and is dribbling in almost daily as the result of negotiations last month.

The principal feature of the domestic market centers around the U. S. armament program. Large inquiries for all types of steel from alloy items up to heavy shapes and plates are being received and hold promise of bolstering the steel industry's activity over the next few months.

Sales of flat rolled products in PHILADELPHIA continue to ease off, but improved demand for pipe, structural steel and tin plate is taking up part of the slack. New bookings thus far in July are running from 10 to 30 per cent below the comparable period of June, the loss being largely in sheet and strip. Oil companies are engaged in rebuilding stocks to a six-month supply basis and tubular bookings are consequently running very heavy. Operations at a district pipe maker's plant have shown considerable improvement lately, but are still less than 50 per cent of capacity. Pennsylvania Railroad, while still buying for old repair projects, has not yet released material on its new car program.

Considerable bidding is being done on material required by various district plants working on the defense program, but few actual orders have been placed. Operations at a privately-owned ordnance plant in Philadelphia will be underway shortly. Production for the time being will be limited to guns.

New business in ST. LOUIS is sharply off as compared with the first or last half of June. A strong renewal of buying is expected there as the defense program unfolds.

The major problem on the PACIFIC COAST seems to be that of obtaining deliveries rather than booking orders. With substantial further tonnages for national defense construction to come on the market in the next few weeks, smaller projects that have not been definitely committed may experience considerable difficulty in getting steel promptly.

Prices

. . . Higher Extras on Quality Steels are a Possibility

New extras on a number of high quality steels are likely to be announced in the near future, reflecting higher raw material costs. It is understood several producers are individually studying matters along this line.

Pig Iron

. . . Production and shipments steady, new buying light

Production and shipment of pig iron at PITTSBURGH continues substantially ahead of a month ago. Iron makers have fairly good backlogs and current levels of production are expected to be maintained for sometime. National Tube Co., McKeesport, has blown in its remaining blast furnace, all four now being in operation. Struthers merchant furnace at Struthers, Ohio, was blown in recently.

Movement of pig iron and by-product foundry coke at CHICAGO is substantially the same now as it was a month ago, with this month expected to end about on a par with June. Foundry operations have been maintained on an even plane, lowered activity at some plants such as automotive being balanced by improved operations at jobbing and railroad foundries. Because of new automotive activity and increasing Government armament work, a rather substantial improvement

in pig iron needs is expected to arise about the middle of August.

Despite the fact the automotive melt is negligible, shipments of foundry coke and pig iron by CLEVELAND producers up to July 20 were running comfortably ahead of the volume in the comparable period of June. This month's pig iron deliveries hold promise of being the best of any month this year.

Summer vacations and slackened melting schedules due to the hot weather are slowing down the rate of shipments in PHILADELPHIA, but it is not expected that this decline will reach the proportions recorded in recent years at this time. New buying is very light, being limited largely to lots of special analysis.

July business in pig iron is holding to June levels in SOUTHERN OHIO. Shipments for July at BUFFALO are expected to approximate the total for June. Similar situations prevail in other districts.

Iron Ore

. . . June consumption from Lake Superior mines 5,212,699 tons

Consumption of Lake Superior iron ore in June rose to 5,212,699 tons from 4,566,200 gross tons in May. This compared with 2,829,667 tons consumed in June last year, according to the report of the Lake Superior Iron Ore Association. Total ore consumed this year to July 1 was 27,332,666 tons, compared with 16,970,886 tons consumed at the same date last year. On hand on July 1 this year at furnaces and on Lake Erie docks were 23,515,802 tons. This total compared with 19,603,350 gross tons a month ago and 25,861,237 tons on July 1, 1939.

On June 30 there were 148 furnaces using principally Lake Superior ore in blast compared with 137 a month earlier and 90 a year ago.

Wire Products

. . . Orders have expanded

. . . Large backlogs in alloy and special wire

With no small measure of support emanating from export demand, total wire business at PITTSBURGH last week was in greater volume than in the week before. The gain was principally in wire rods and some mills are rapidly reaching the point where deliveries have been extended considerably into the future. English orders for wire rods have been substantial recently and activity by Japan was somewhat greater than it has been in several months. Domestic rod business has changed little from a week ago. Manufacturers' wire demand continues relatively slow and merchant wire sales are coming up to seasonal expectations.

Demand for manufacturers' wire and rods has become stronger at CLEVELAND during the past week. Export orders and U. S. armament requirements are among the principal factors. Particularly large backlogs exist now in alloy wire and special wire.

Structural Shapes

• • • **Tremendous tonnages** ahead in shapes, plates and piling.

Structural mills at Pittsburgh continue to build up comfortable backlogs, and deliveries are becoming extended, ranging from three to four weeks. Export demand has been an important factor recently, but the real push for material is expected to materialize before the end of the year when large Government contracts will have been awarded. Although specific tonnages have not been worked out yet, the volume of plate, shape, and piling sections will be tremendous.

Structural demand at CHICAGO is benefited by increased Government requirements and needs of expanded construction. There also has been a notable improvement in State highway bridge construction. Most pending projects involve only small tonnages but the total of all jobs is definitely substantial. One leading producing interest reports last week's bookings the best of any week so far this year.

Fabricated structural steel awards declined to 29,925 tons from 49,125 tons last week. The largest lettings are for the Government and include 4300 tons for five hangars at Chicopee Falls, Mass., and 4185 tons for 44 magazines at Savanna, Ill. Other sizable awards are 3446 tons at Kettle Falls, Wash., for relocation of the Great Northern Railroad bridge over the Columbia River; 2465 tons at Los Angeles for five buildings for the Aluminum Co. of America; 1800 tons for an airplane repair deck at Paterson Field, Dayton, Ohio; 1450 tons for pot rooms at Alcoa, Tenn., for the Aluminum Co. of America, and 1400 tons for 20 radial spillway gates at Watts Dam, Tenn.

New structural steel projects declined to 13,100 tons. The largest inquiries include 1700 tons for the Woodrow Wilson high school at Queens, N. Y., and 1200 tons at Quonset Point, R. I., for a double unit hangar for the Navy Department.

Reinforcing Steel

. . . Awards Total 12,225 Tons, Inquiries for 5150

Reinforcing steel awards of 12,225 tons include 4835 tons for fleet supply base storehouses at Oakland, Cal., and 1900 tons for a technological building at Evanston, Ill., for the Northwestern University.

New reinforcing steel projects of 5150 tons include no inquiry of more than 950 tons.

Plates

. . . Volume of new orders is steadily rising

Plate specifications at PITTSBURGH continue to increase and in some cases, particularly wide plates, deliveries are not less than 30 to 40 days. Specifications for shipbuilding are being received steadily, with more to come; railroad repair shops and car builders are specifying heavily, and demand for armor plate is on the upgrade with an initial placement of light tanks.

At CHICAGO demand continues in good volume. Wide plates, 84 in. and larger, are moving particularly well. Deliveries in many cases are extended as far ahead as late September despite current heavy production schedules. Storage tank requirements are among the strongest, though increased highway bridgework, government needs, and construction activity also are cited as issuing steady call. Considerable tonnage for Army use is reported among current orders. A leading interest indicates plate orders last week were heaviest this year.

Sales in Philadelphia in the past week were not as heavy as in the preceding week, but in view of the amount of material out for bidding this decline is not taken as being

indicative of a new trend. Demand continues to emanate for widely diversified sources. Fabricators and tank makers are seasonally more active and shipyards and railroads are providing better support than a month ago. Export sales are slow. Shipment by independent Eastern Pennsylvania mills can be made in from a week to 10 days, but larger producers require three to four weeks.

South Africa has been one of the most active export markets for plates in recent weeks. Inquiries and orders from South America have been spotty, mostly in lots of 25 to 50 tons, but an order was taken in New York last week of about 500 tons. The order was placed within a few hours of the receipt of the inquiry, but this fast action is an exception. Recent plate inquiries have come from Portugal and Iceland. Export plate prices are on the firm side and no business is being taken below the official price, as was the case a month ago.

In the NEW YORK market, plate volume is running substantially better than for the comparable June period, although there are few outstanding tonnages.

Consolidated Steel Corp., Los Angeles, booked 3250 tons for that portion of the Los Angeles Metropolitan Water District's Orange County feeder that was awarded under the steel pipe alternate.

NEWPORT PRODUCTS

Hot Rolled Sheets • Newport Electrical Sheets • GOHI Pure Iron-Copper Alloy Sheets • Globe Brand Galvanized Steel Sheets Roofing and Siding • GOHI Enameling Iron Sheets • KCB Copper Steel Sheets • Newport Long Terne Sheets • Newport Galvannealed and DeLuxe Metal Sheets

LEADING enamelers quickly recognize the outstanding superiorities of GOHI Enameling Iron and the many production advantages made possible through its use, with the result that this fine metal is accorded top rating by those who demand the utmost in performance, whose manufacturing facilities are geared up to highest operating efficiency.

GOHI Enameling Iron is metallurgically pure, free from grease and pickle marks. The smooth, satiny surface holds the enamel tightly — many common enameling troubles are eliminated, and the appearance and longevity of the finished product are immeasurably improved.

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DIVISION OF THE ANDREWS STEEL CO.

ANDREWS PRODUCTS IN CARBON AND ALLOY STEEL: Bars • Plates • Universal Mill Plates • Sheet Bars • Billets • Blooms • Slabs

Semi-Finished Steel

. . . New orders include British and Japanese buying

Reflecting a normal fluctuation in weekly tonange figures, semi-finished steel specifications at PITTSBURGH expanded considerably in the past week, the increase being from both domestic and foreign consumers. Shipments are being maintained at record levels to non-integrated mills who are cleaning up old sheet tonnage and steel for export is moving to destinations rapidly. Fresh business in the past week included bookings for Britain and Japan.

At CLEVELAND and YOUNGSTOWN new business up to July 20 was showing a gain over the comparable part of June and from all indications this month will be better than any July since 1929.

Tubular Goods

. . . Defense requirements are beginning to be reflected

Merchant pipe sales continue to gain at PITTSBURGH and further increases are expected as large-scale Government projects are begun. Pipe involved in some of the larger Navy contracts for seaplane bases runs into substantial tonnages. Oil country goods demand is still dull and orders so far this month are running from 10 to 25 per cent behind a month ago. Miscellaneous line pipe requirements are fair but prices continue highly irregular.

At YOUNGSTOWN some pipe mills are reported working 20 turns a week. An additional continuous buttweld unit is scheduled to start this week and electric weld mills continue very active. In the CLEVELAND-LORAIN area production is regaining the pace which prevailed prior to the one week vacation shutdown starting July 14.

Merchant Bars

. . . Heavy inquiries for U. S. defense program now a feature

Bar bookings at PITTSBURGH continue to expand, orders in the past week gaining moderately from a week ago. Some mills are quoting three to four weeks on small bar sizes and little or no headway has been made on total backlogs. Additional shell steel has been ordered from abroad and mills are also figuring on some initial tonnages which are part of the United States defense program.

At Chicago mills carbon and alloy bar demand generally is slacker, though this applies chiefly to carbon bars. Most consumers are deemed to hold rather comfortable inventories, with summer seasonal factors accounting mostly for the easier pace of ordering. Renewed automotive demand next month will bring increased activity, however. Alloy steel bars generally are maintained in demand, with virtually no change noted from a month ago at most plants. Merchant bar deliveries now run about three to five weeks.

Orders up to July 20 at CLEVELAND were ahead of those received in the corresponding part of June. Principal new business is coming from the British and diversified domestic sources. The feature of the market lately has been heavy inquiries in connection with the U. S. rearmament program. Deliveries on small bars remain extended.

Railroad Buying

. . . Illinois Central heads list with purchase of 3000 cars

Purchase of 3000 freight cars by Illinois Central and placing of 48 locomotives by various railroads made the past week one of the most active the equipment makers have experienced in several months. The Illinois Central purchase, valued at $9,375,000, was allocated as follows: 1000 cars to General American Transportation Corp.; 1000 cars to Pullman-Standard Car Mfg. Co.; 500 cars to American Car & Foundry Co., and 500 to Mt. Vernon Car & Mfg. Co. Approximately 30,000 to 35,000 tons of steel will be required to build these cars.

The locomotive purchases included 25 diesel-electric switchers for Baltimore & Ohio, awarded to Electro-Motive Corp.; 10 for the Reading, of which three were awarded to Baldwin Locomotive Works, three to American Locomotive Co. and four to Electro-Motive Corp.

Illinois Central has ordered one 2000-hp. locomotive from Electro-Motive Corp., and Atchison, Topeka & Santa Fe has placed 10 steam locomotives with Baldwin Locomotive Works. Baldwin has also been awarded one 4-6-2 locomotive by Alaska Railroad, and one 2-8-2 locomotive by Sao Paulo-Parana Railroad of Brazil.

Other equipment purchases reported in the past week include 50 box cars for Norfolk & Western, placed with Greenville Steel Car Co., and 500 hopper cars for Virginian, placed with its own shops. American Refrigerator Transit Co.

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This Surface-Combustion **Soaking Pit, recently installed in the Pittsburgh district, is insulated with 12" x 36" J-M Superex Blocks (shown above) and with JM-20 and Sil-O-Cel C-22 Brick.**

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is planning to build 100 refrigerator cars in its own shops in St. Louis. Pullman-Standard Car Mfg. Co. will build seven streamlined passenger cars for Illinois Central. Action is expected shortly on the inquiry for 1000 ballast cars by Union Pacific.

Western Maryland has ordered 2000 tons of rails, dividing the order between Carnegie - Illinois Steel Corp. and Bethlehem Steel Co. Reading has placed 100 tons of rails with Bethlehem Steel Co.

Sheets and Strip

. . . Strip ordered for cartridge clips and machine gun belt links

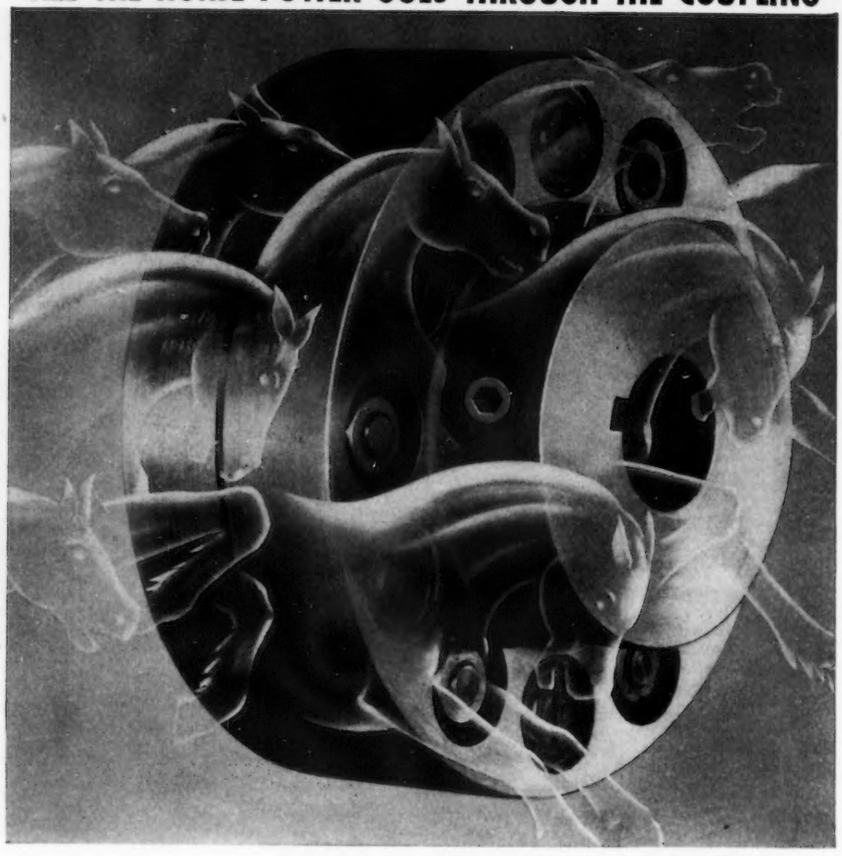
Fresh sheet business at PITTSBURGH still reflects numerous accounts, but individual tonnages obviously remain small. This quiet condition, however, is not reflected in the strip steel market, where fresh orders are substantially in excess of what had been expected. This latter condition is apparently due in some measure at least to government orders, a recent example of which involves more than 1000 tons of high carbon strip steel placed with a Pittsburgh manufacturer for cartridge clips. CLEVELAND reports the manufacture of metallic belt links for 50 and 30-caliber machine guns is providing an extensive market for cold-rolled spheroidized strip, 59 to 74 carbon. The Rock Island Arsenal has made several awards, the latest involving 70,000,000 units. Several additional large lots are scheduled to come out.

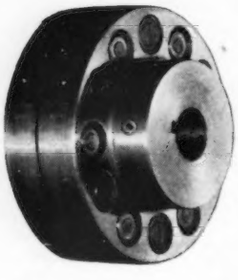
Buying by automobile companies is expected to expand substantially before the middle of August. In CHICAGO rolling of sheets and strip for heavier automotive specifications is expected to get under way about Aug. 1. Currently there has been a slight lull in flat rolled demand, this attributed chiefly to recent heavy coverage by numerous consumers. Resumption of automotive needs will take up the present slack in sheet and strip business, it is felt. Meantime, the lull permits of improved deliveries, which now average about four to five weeks. Practically all low-priced sheet and strip contracts will be cleaned up by the end of this month with the exception of tonnages for automotive interests and large manufacturers who had previously obtained future delivery dates, some of which extend well into the fourth quarter, it is understood.

Mill bookings the past week in the SOUTHERN OHIO area were equal to about 60 per cent of capacity.

Sheet specifications in the NEW YORK area are running about one-third the volume of the comparable June period, which is a better rate than most expected in view of large coverages made at the cut price up until June 29. A manufacturer with a government contract is making inquiry for approximately 600 tons of heavy sheets. Export sheet inquiries are light.

ALL THE HORSE POWER GOES THROUGH THE COUPLING





HOW TO PROTECT YOUR DIRECT-CONNECTED MACHINES AGAINST WEAR AND SHUT DOWNS

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Tin Plate

. . . Operations decline to 73%

Tin plate operations this week are estimated at 73 per cent, down one point from a week ago. Total specifications compare favorably with a week ago. The outlook for export business remains clouded.

Controllers Offer Aid to Gov't on Price Problems

Washington

Members of the Controller's Institute of America will be called upon by the National Defense Advisory Commission to advise on problems related to prices as they are affected by taxation, cost requirements, amortization and depreciation policies as well as methods of financing increased plant and facility purchases. Advice on other problems also will be asked.

Announcement to this effect was made by Leon Henderson, member of the Advisory Commission in charge of industrial price stabilization problems, in making known that the institute has made available to the commission a list of 10 members who stand ready to act individually in an advisory capacity whenever they may be called upon to do so.

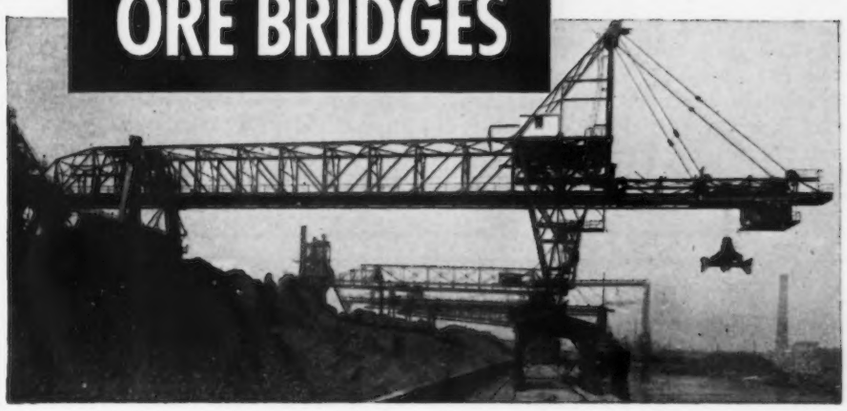
The 10 members of the institute offering their services are: Charles C. Jarchow, controller, American Steel Foundries, Chicago; L. D. McDonald, vice-president, Warner & Swasey Co., Cleveland; Roscoe Seybold, vice-president and controller, Westinghouse Electric & Mfg. Co., Pittsburgh; F. Eakin, vice-president and controller, A. E. Staley Mfg. Co., Consolidated, Decatur, Ill.; E. R. Baines, vice-president and controller, Underwood Elliott Fisher Co., New York; Stanley W. Duhig, vice-president and treasurer, Shell Union Oil Corp., New York; Robert E. Frederickson, secretary and treasurer, the Symington-Gould Corp., Rochester, N. Y.; H. H. Hollinger, controller, Firestone Tire & Rubber Co., Akron, Ohio; H. T. Warshow, controller, National Lead Co., New York and Harry H. Weinstock, auditor, The New York *Times*, New York.

Westinghouse Creates Division For Defense

• • • **The Westinghouse Electric** & Mfg. has announced appointment of the key men in its newly created emergency products division, organized to produce defense equipment under the government's preparedness program.

Frank Davies Newbury, manager of the division, said that in addition to producing all of the company's emergency products requiring new manufacturing facilities, his organization would also act as coordinator in negotiations involving emergency products which Westinghouse is now prepared to make in existing operating divisions. Mr. Newbury's staff includes L. D. Rigdon, mgr. of manufacturing; C. S. Coler, mgr. of industrial relations, and W. D. O'Connell, auditor.

DRAVO DESIGNS AND BUILDS ORE BRIDGES



• Great flexibility for handling ore cargoes from ship to dock is provided in this bridge built by Dravo for Great Lakes Steel Corporation. 350 feet overall, it has a central span of 187 feet, carries a 10-ton bucket. Apron hoist provides clearance for steamer masts.

• Whether the problem is one of modernizing old equipment, replacing obsolete handling machines or designing special facilities to meet new problems, consultation with Dravo Corporation may prove to be of great value to you.

• Added to its ability to fabricate and erect structures such as the one shown here, Dravo Corporation has had years of experience building docks, retaining walls, plant foundations—everything that enters into the problem of terminal facilities. Inquiries relative to specific problems may be addressed to

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ENGINEERING WORKS DIVISION
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Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Huge Inquiries Coming Out

New York

• • • Inquiries are coming out in tremendous volume here in the East, many of them for quantities of 50 to 100 machines at a time and often of the same type. Milling machines are particularly in demand. Practically all of this activity is on the part of concerns who either have government contracts or are in line to receive them, or the arsenals themselves. Much equipment is being quoted for delivery well into 1941. Sources outside the trade are offering a large batch of milling machines for immediate delivery, but the details are shrouded in mystery. It is assumed, however, that they are machines on the dock originally destined for the French. Changes in leadscrews and dials would be necessary to convert them to the inch system in place of metric sizes. Considerable red tape surrounds the release of such machines, however.

Normal Industrial Demand

Chicago

• • • **New business** to date in July is running even with the comparable period a month ago. June, it will be remembered, was for most Chicago machine tool dealers one of the best months in history. Activity seems to be increasing again after a slight lull. Most of this month's bookings so far can be ascribed to normal industrial demand. If the Rock Island Arsenal releases some of the machines on which it is holding quotations, this business alone probably would cause July to parallel June's total and perhaps exceed it. Though the arsenal's purchasing procedure has been freed from much red tape, it is still hampered considerably by Government policies. Industries with Federal orders are holding up machinery programs pending settlement of details with the Government. Additions are being considered to some of the Rockford plants, and also at Fond du Lac. Available information indicates that these will not be large expansions, but will mainly provide more "elbow room."

Buying on Moderate Scale

Detroit

• • • **Machine tool buying** continues on a broad but moderate scale. The next 10 days are expected to see the initiation of a Packard tooling program to fulfill the Rolls Royce engine contract which should be signed shortly. Other large programs in this area are lacking although inquiries continue from organizations making preliminary studies of jobs to be done in the defense program. The Chrysler tank project is still in the study-inquiry stages. National Broach & Machine Co. has begun the expenditure of $150,000 for new machine tools, carrying out its fourth expansion in five years.

Defense Program Reflected

Cleveland

• • • **Echoes of the** government defense program are being received here in increasing volume each day in the form of inquiries and actual orders. Most of the propositions are accompanied by insistence on quick deliveries, often difficult to arrange in view of the extended order backlogs. Outside of a $600,000 inquiry from the British for machines to be delivered next June, the foreign field has been comparatively quiet from the standpoint of new propositions. Production, of course, continues strong against the large volume of orders which the British are taking over from the French.

Press manufacturers report that July order volume is running equal to that of June, which was a very good month but not up to May.

the practical side of Springmaking — BY DUNBAR

What about WIRE FORMS?

Watch your loops—Nos. 2 and 3 at left are generally less expensive than No. 1.

*

Much care should be used to select proper material—round, square or rolled wire.

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In specifications, direction of action should be shown.

*

Experience, not formulas, is the best qualification for wire form manufacture.

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BRISTOL, CONNECTICUT

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Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, July 23—The non-ferrous markets in the past week continued to coast along, supported largely by the heavy flow of shipments into consumption. The weakness in copper prices and the uncertainty over the possible outcome of the German attack on Great Britain, which many traders feel will vitally affect the course of the market here, are keeping buyers in the background. Copper sales in the past week were very light and quotations of custom smelters and small producers worked down to 10.625c. a lb., Valley delivery. Large mine producers are still rigidly maintaining their prices at 11.50c. a lb. Sales of the red metal for the current month through Saturday total about 24,600 tons, or about ¼ the total of the comparable period of June.

Despite the current lack of activity in the copper market, consumption is proceeding at a high rate. Consumers, especially the brass mills, are all well covered on their potential needs for the next few months. Export demand is slow.

Zinc

Prime Western sales in the past week were 8861 tons, mostly nearby metal, as compared with 2646 tons in the previous week. The week's buying probably represents requirements unanticipated a month ago during the heavy buying wave. Most consumers are still well covered on needs of the immediate future and sellers' backlogs are still large, precluding the possibility of another buying movement for some time to come. Shipments in the past week were 5317 tons, as against 5826 in the preceding week. Prices are firm and unchanged at 6.64c. per lb., New York.

Lead

Lead buying in the week past was slightly more active than in the preceding week, but the period's total, as compared with shipments, indicated that buyers were still working off the large commitments made earlier in the month. Most of the week's buying was, surprisingly, for July metal, although theoretically that month's needs are completely covered. In the first two days of the present week buying shifted to August positions, but was not as heavy as in the preceding week. Prices are unchanged at 5c. per lb., New York. Stocks of refined lead in June dropped 7612 tons to 55,343 tons, the lowest in 10 years. Shipments advanced to 49,904 tons, highest since November, 1939, from 46,919 tons in May, while production declined from 46,268 tons in May to 42,306 tons in June.

Tin

Fairly active buying by both consumers and the Government kept the market active throughout the past week, with prices steady throughout the period at 51c. a lb., New York, for nearby Straits. Tin plate makers, despite their heavy stocks, are replenishing these reserves as they are used as a precautionary measure. Recent events in the Far East have tended to encourage a policy of building up reserves sufficient for at least a year. Prompt metal is still extremely tight, with the probability that Government buying may lead to fairly large premiums on prompt metal in the future.

Pittsburgh Steel Co. Buys Old National Works

Pittsburgh

• • • **Pittsburgh Steel Co.** interests have acquired the site of Carnegie-Illinois Steel Corp.'s idle tin plate mill at Monessen, Pa. The acquisition will provide Pittsburgh Steel with space for possible future expansion as the old National works adjoins the Monessen plant of the Pittsburgh Steel Co.

"All-Purpose" AIR ... COMPRESSORS
As builders of high grade pneumatic apparatus for 70 years, we offer a line of Air Compressors (and accessories), suitable for varied pneumatic requirements in mill and factory. Superior design, high grade materials, skilled workmanship, combine to produce highly efficient and reliable machines that give enduring service at low operating costs . . . There is one to fit your specific needs economically. Let us analyze your conditions and make recommendations. » » » » »
Many Types and Sizes up to 200 cu. ft.
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A rugged machine, two-cylinder, single-stage, water-cooled, for continuous duty at 140 lbs. air pressure. Has many distinctive engineering and structural features. Sizes 46 to 157 cu. ft. Complete outfit with motor, either direct or belt drive. Separate compressor unit also available for coupling or belt drive . . . Catalogue T-2055.
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Westinghouse » » »
AIR BRAKE CO.
INDUSTRIAL DIVISION
PITTSBURGH, PA.

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

• • • **So little mill buying** is going on that it is difficult to get an accurate appraisal of the market in many districts. Quoted prices this week are based largely on broker coverages, but on this basis No. 1 steel is down 50c. on the average at Pittsburgh, and coverages at Chicago within the last few days warrant a drop of 12½c. in the average price of No. 1 there. At Philadelphia, the market is nominally unchanged since new buying has practically ceased. As a result, the composite price has declined 21c. to $18.17, making a decline of 75c. since July 2 and of $1.75 since the last high of $19.92 on June 18. There is evidence that the bottom of the present reaction may be in sight. Cleveland prices are down 50c. on recent mill sales, but quotations at Youngstown, Birmingham, Detroit and Buffalo are unchanged, although at the latter point the largest consumer has reduced its offers by 50c. compared with the last large purchase. Dealer buying prices, in several centers, however, still reflect the general weakness in the market.

Taking advantage of weakness that developed in the export market as a result of Italian shipments being held up upon that country's entering the war, the Japanese since early June have contracted for approximately 300,000 tons of scrap at a price around $17 a ton for the No. 1 steel. Based on 1939 activity, this would have been a normal purchase over two months, although shipments to Japan have been much less than this rate thus far in 1940.

Chicago

Scrap market prices are virtually unchanged, though sentiment is somewhat weaker due chiefly to the low degree of activity in consumer purchasing. No. 1 steel is quoted $17 to $17.50 with the latter figure representing the price paid at the last mill sale. Dealers have been obtaining $17.25 for tonnages, but in the past few days reports of $17 have been heard. Movement of scrap to mills on old orders is heavy but otherwise activity is at a minimum.

Pittsburgh

The market lacks clarification, with broker and consumer buying ranging between $18 and $19 a ton on No. 1 heavy melting. Broker activity is in excess of consumer buying, with the latter reflecting little or no interest at the present time. No. 1 heavy melting steel is quoted this week at $18 to $19 a ton, down 50c. from last week's average. Scrap rails have been sold at higher than current quotations but such sales have been for foundry consumption to points nearby this district and there has been little or no open-hearth buying of rails. Railroad heavy melting steel is not as strong as it was a week ago.

Philadelphia

Prices here remain nominally unchanged. Mill buyers appeared more active in the past week in feeling out the market, but continued to refrain from making new commitments. The high rate at which melting operations are being maintained in this district together with the low level of dealers' stocks leads some traders to feel that a resistance point has been reached. On the other hand, the flow of material, especially manufacturers' scrap, from the New York and New England areas is very heavy.

Youngstown

Heavy melting prices are nominal and unchanged here this week, and some sources hold that the bottom may have been reached. Open hearth and blast furnace activities are stronger than in any July since 1929, and orders of one large mill buyer are reported running out. However, another sharp upsurge such as occurred at the start of the summer is not counted upon. With more electric furnace capacity being installed in central Ohio, it is likely demand will be intensified for low phos. grades.

Cleveland

No. 1 heavy melting scrap is quoted down 50c. a ton here this week to a range of $18 to $18.50. One mill has been buying bundles, and mixed No. 1. Blast furnace grades, also in good demand locally, are showing resistance to the downward trend.

Buffalo

The leading district consumer this week has reduced its bid 50c. to $18 for No. 1 heavy melting steel, though small orders are reported in fair volume at the prevailing range of $18.50 to $19. One mill has lifted restrictions and is accepting scrap on a liberal quota basis. Consumption of scrap by local mills has perhaps reached an all-time peak with no immediate prospect of a letdown.

St. Louis

Some scrap iron prices were lower from 25c. to $1 a ton, but the list for the most part was unchanged as compared with the preceding week. The recent declining market has brought the usual heavy offerings from country dealers although gathering of scrap has been halted by farmers' work in the field. A small tonnage of melting and cast steel was purchased by an East Side mill.

Cincinnati

With a further reduction of 50c. in dealers' bids, the trade generally feels that the downward trend of the district market has run its course. Weakness seems to be more technical than actual since mill operations are unseasonably high, but consumers are reluctant to contract for heavy amounts of scrap unless price attractions are offered.

Birmingham

Birmingham's scrap market is definitely weaker with export material backing into the market through heavy decline in scrap exports, dealers declare. Republic Steel Corp., largest district consumer, appears to be out of the market indefinitely. Prices quoted on heavy melting steel are priced on last purchases. These prices would be lower if there was buying. Scrap dealers have already adjusted their buying prices in line with the weaker market.

Detroit

Unchanged in price from a week ago, scrap in the Detroit area continued to move only slowly. Automotive production of scrap is on the upgrade since most parts plants are now turning out parts for 1941 models. Auto body plants, however, are for the most part at their lowest point for the year and will not get into volume production until August.

Boston

Shipments to Japan now exceed those to England. As for domestic business, small tonnages of steel turnings are going to eastern Pennsylvania at $7.15 to $7.50 a ton on cars and generally at $8.15 to the Pittsburgh district. The $7.15 and $8.15 a ton contracts will expire at the close of July. Prices for bundled skeleton are easier due to a lack of demand. As high as $20 a ton delivered on a high freight rate has been obtained for textile cast, but tonnage involved was small.

New York

The recent purchase by the Japanese of something under 300,000 tons ranges back to early June and includes some berth space lots of 500 tons and under. The bulk of the business was placed last week, however. Shipment will be made from both Atlantic and Pacific ports. In making this purchase, at an average price of $17.15 for the No. 1 steel, the Japanese took advantage of Italy's dropping out of the market following declaration of war and of the release of some fairly large accumulated tonnages, although about 40,000 tons of this material went by barge to Buffalo on a sale made in late June. The June composite price on which July shipments to Great Britain will be based averaged $19.31, although the current figure is much less. Export buying prices for material delivered to barges are unchanged this week.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$18.00 to $19.00
Railroad heavy mltng.	19.00 to 20.00
No. 2 heavy melting...	17.00 to 17.50
Railroad scrap rails...	20.50 to 21.00
Rails 3 ft. and under..	22.50 to 23.00
Comp. sheet steel.....	18.00 to 19.00
Hand bundled sheets..	17.00 to 18.00
Heavy steel axle turn.	17.00 to 17.50
Machine shop turnings	13.50 to 14.00
Short shov. turnings..	15.50 to 16.00
Mixed bor. & turn.....	11.00 to 11.50
Cast iron borings	11.00 to 11.50
Cast iron carwheels...	20.00 to 20.50
Heavy breakable cast.	16.00 to 16.50
No. 1 cupola cast.....	19.50 to 20.00
RR. knuckles & coup..	24.50 to 25.00
Rail coil springs	24.50 to 25.00
Rail leaf springs.....	24.50 to 25.00
Rolled steel wheels....	24.50 to 25.00
Low phos. billet crops.	25.00 to 25.50
Low phos. punchings..	25.00 to 26.00
Low phos. heavy plate.	23.00 to 23.50
Railroad malleable ...	23.50 to 24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$18.50 to $19.00
No. 2 hvy. mltng. steel.	17.00 to 17.50
Hydraulic bund., new.	18.50 to 19.00
Hydraulic bund., old..	15.50 to 16.00
Steel rails for rolling..	22.00 to 22.50
Cast iron carwheels...	20.50 to 21.00
Hvy. breakable cast...	19.00 to 19.50
No. 1 cupola cast.....	21.00 to 21.50
Mixed yard (f'd'y) cast	18.00 to 18.50
Stove plate (steel wks.)	15.00 to 15.50
Railroad malleable	22.50 to 23.00
Machine shop turn.....	12.50 to 13.00
No. 1 blast furnace...	11.50 to 12.00
Cast borings	11.50 to 12.00
Heavy axle turnings...	16.50 to 17.00
No. 1 low phos. hvy...	24.00 to 24.50
Couplers & knuckles..	24.00 to 24.50
Rolled steel wheels....	24.00 to 24.50
Steel axles	23.50 to 24.00
Shafting	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
Cast borings (chem.)..	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel.....	$17.00 to $17.50
Auto. hvy. mltng. steel alloy free	16.25 to 16.50
No. 2 auto steel.....	13.75 to 14.25
Shoveling steel	17.00 to 17.50
Factory bundles	16.75 to 17.00
Dealers' bundles	15.25 to 15.50
No. 1 busheling	16.25 to 16.50
No. 2 busheling, old...	8.00 to 8.50
Rolled carwheels	20.50 to 21.00
Railroad tires, cut	21.00 to 21.50
Railroad leaf springs..	18.50 to 19.00
Steel coup. & knuckles.	20.50 to 21.00
Axle turnings	16.25 to 16.75
Coil springs	22.00 to 22.50
Axle turn. (elec.).....	17.75 to 18.25
Low phos. punchings.	20.50 to 21.00
Low phos. plates 12 in. and under	20.50 to 21.00
Cast iron borings.....	10.50 to 11.00
Short shov. turn.	11.50 to 12.00
Machine shop turn.....	11.50 to 12.00
Rerolling rails	21.50 to 22.00
Steel rails under 3 ft..	19.75 to 20.25
Steel rails under 2 ft..	21.00 to 21.50
Angle bars steel	20.00 to 20.50
Cast iron carwheels...	18.75 to 19.25
Railroad malleable	22.00 to 22.50
Agric. malleable	14.75 to 15.25
	Per Net Ton
Iron car axles	23.50 to 24.00
Steel car axles	22.00 to 22.50
Locomotive tires	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 machinery cast..	16.50 to 17.00
Clean auto. blocks	17.25 to 17.75
No. 1 railroad cast.....	15.00 to 15.50
No. 1 agric. cast.....	13.50 to 14.00
Stove plate	10.75 to 11.25
Grate bars	12.50 to 13.00
Brake shoes	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$18.50 to $19.00
No. 2 hvy. mltng. steel.	17.50 to 18.00
Low phos. plate	20.50 to 21.00
No. 1 busheling	17.75 to 18.25
Hydraulic bundles	18.00 to 18.50
Machine shop turn....	13.00 to 13.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$18.00 to $18.50
No. 2 hvy. mtng. steel.	17.00 to 17.50
Comb. sheet steel	$17.50 to $18.00
Light bund. stampings	14.50 to 15.00
Drop forge flashings...	17.00 to 17.50
Machine shop turn....	11.50 to 12.00
Short shov. turn.....	12.00 to 12.50
No. 1 busheling.....	17.25 to 17.75
Steel axle turnings....	17.00 to 17.50
Low phos. billet and bloom crops	23.00 to 23.50
Cast iron borings.....	12.00 to 12.50
Mixed bor. & turn.....	12.00 to 12.50
No. 2 busheling.....	12.00 to 12.50
No. 1 cupola cast.....	20.50 to 21.00
Railroad grate bars...	14.00 to 14.50
Stove plate	14.00 to 14.50
Rails under 3 ft.....	23.00 to 23.50
Rails for rolling	23.00 to 23.50
Railroad malleable	21.50 to 22.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$18.50 to $19.00
No. 2 hvy. mltng. steel.	16.50 to 17.00
Scrap rails	21.00 to 21.50
New hvy. b'ndled sheets.	16.50 to 17.00
Old hydraul. bundles..	15.00 to 15.50
Drop forge flashings..	16.50 to 17.00
No. 1 busheling.....	16.50 to 17.00
Machine shop turn.....	11.00 to 11.50
Shov. turnings	13.00 to 13.50
Mixed bor. & turn.....	11.50 to 12.00
Cast iron borings.....	11.50 to 12.00
Knuckles & couplers..	22.50 to 23.00
Coil & leaf springs....	22.50 to 23.00
Rolled steel wheels....	22.50 to 23.00
No. 1 machinery cast.	19.50 to 20.00
No. 1 cupola cast.....	18.00 to 18.50
Stove plate	15.50 to 16.00
Steel rails under 3 ft...	23.50 to 24.00
Cast iron carwheels...	18.00 to 19.00
Railroad malleable	22.00 to 23.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$15.75 to $16.75
No. 1 hvy. melting.....	14.00 to 14.50
No. 2 hvy. melting.....	13.75 to 14.25
No. 1 locomotive tires.	17.50 to 18.00
Misc. stand. sec. rails.	17.50 to 18.00
Railroad springs	18.50 to 19.00
Bundled sheets	10.50 to 11.00
Cast bor. & turn.....	7.50 to 8.00
Machine shop turn.....	9.00 to 9.50
Heavy turnings	12.00 to 12.50
Rails for rolling	19.00 to 19.50
Steel car axles	20.50 to 21.00
No. 1 RR. wrought....	11.50 to 12.00
No. 2 RR. wrought....	13.50 to 14.00
Steel rails under 3 ft...	20.00 to 20.50
Steel angle bars	17.25 to 17.75
Cast iron carwheels...	16.50 to 17.00
No. 1 machinery cast..	18.50 to 19.00
Railroad malleable ...	18.00 to 18.50
Breakable cast	15.50 to 16.00
Stove plate	11.00 to 11.50
Grate bars	12.00 to 12.50
Brake shoes	11.50 to 12.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.50 to 13.00
Scrap rails for mltng...	19.50 to 20.00
Loose sheet clippings..	8.75 to 9.25
Hydrau. b'ndled sheets	13.25 to 13.75
Cast iron borings	5.50 to 6.00
Machine shop turn....	6.50 to 7.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	4.25 to 4.75
Rails for rolling	21.00 to 21.50
No. 1 locomotive tires.	15.50 to 16.00
Short rails	21.50 to 22.00
Cast iron carwheels...	15.50 to 16.00
No. 1 machinery cast..	18.00 to 18.50
No. 1 railroad cast....	16.50 to 17.00
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Agricul. malleable	14.50 to 15.00
Railroad malleable	17.50 to 18.00
Mixed hvy. cast	15.25 to 15.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	....	$16.50
No. 2 hvy. melting steel	....	15.50
No. 1 busheling	....	14.00
Scrap steel rails	....	15.00
Steel rails under 3 ft...	....	17.50
Rails for rolling	....	17.50
Long turnings	....	5.00
Cast iron borings	....	7.50
Stove plate	....	11.00
Steel axles	....	18.00
No. 1 RR wrought....	....	14.00
No. 1 cast	....	16.00
No. 2 cast	....	12.50
Cast iron carwheels...	....	13.00
Steel car wheels	....	16.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting..	$14.00 to $14.50
No. 2 heavy melting..	13.00 to 13.50
Borings and turnings..	9.50 to 10.00
Long turnings	9.00 to 9.50
Short shov. turnings..	10.00 to 10.50
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast...	15.00 to 15.50
Stove plate	11.50 to 12.00
Hydraul. Comp. sheets	16.00 to 16.50
New busheling	14.50 to 15.00
Sheet clips	13.00 to 13.50
Flashings	14.00 to 14.50
Low phos. plate	17.00 to 17.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.50 to 13.00
Hvy. breakable cast...	15.00 to 15.50
No. 1 machinery cast.	17.00 to 17.50
No. 2 cast	15.00 to 15.50
Stove plate	11.00 to 11.50
Steel car axles	20.00 to 20.50
Shafting	20.00 to 20.50
No. 1 RR. wrought....	14.50 to 15.50
No. 1 wrought long....	13.00 to 13.50
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling	16.50 to 17.50
Clean steel turnings*..	8.50 to 9.00
Cast borings*	8.50 to 9.00
No. 1 blast furnace....	8.50 to 9.00
Cast borings (chem.)..	10.00 to 11.00
Unprepared yard scrap	8.00 to 8.50
Light iron	6.00 to 6.50
Per gross ton delivered local foundries:	
No. 1 machin. cast.....	$18.00 to $19.00
No. 2 cast	16.00 to 16.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$13.75 to $14.00
Machine shop turn.....	7.15 to 8.15
Mixed bor. & turn.....	.... 6.00
Bun. skeleton long....	11.00 to 11.25
Shafting	18.50 to 18.75
Stove plate	9.65 to 9.75
Cast bor. chemical.....	8.00 to 8.50
Per gross ton delivered consumers' yards:	
Textile cast	$17.00 to $20.00
No. 1 machine cast....	17.00 to 19.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel.	$14.00 to $14.25
No. 2 steel	13.00 to 13.25

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	$13.00	$13.00	$14.00
No. 2 hvy. mltng. steel	12.00	12.00	13.00
Bundles	11.00	11.00	12.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel.....	$11.50	$11.00
No. 1 hvy. mltng. steel.	11.25	10.75
No. 2 hvy. mltng. steel.	10.00	9.50
Mixed dealers steel...	8.75	8.25
Drop forge flashings...	9.75	9.25
New loose clippings...	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.50	13.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng steel.....	$15.00
No. 2 hvy. mltng. steel.....	13.00
No. 2 cast	14.00
Stove plate	12.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	$15.50 to $16.00
No. 2 hvy. mltng. steel.	14.00 to 14.50
Rail (scrap)	15.50 to 16.00
Stove plate	12.25 to 12.50
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel.	$17.00 to $17.50
No. 2 hvy. mltng. steel.	16.00 to 16.50

Construction Steel

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings decline to 29,925 tons from 49,125 tons last week; new projects lower at 13,100 tons against 23,600 tons a week ago; plate awards total 3450 tons.

AWARDS

NORTH ATLANTIC STATES

4300 Tons, Chicopee Falls, Mass., five hangars, to Bethlehem Steel Co., Bethlehem, Pa.

925 Tons, Erie, Pa., extension to building No. 4, General Electric Co., to Ingalls Iron Works Co., Birmingham.

900 Tons, State of Pennsylvania, road guard posts for Pennsylvania Turnpike Commission, to Bethlehem Steel Co., Bethlehem, Pa.

850 Tons, Burlington, Vt., Waterman Memorial Building for University of Vermont, to American Bridge Co., Pittsburgh.

430 Tons, Beaver Falls, Pa., extension for Babcock & Wilcox Tube Co., to Bethlehem Steel Co., Bethlehem, Pa.

300 Tons, Philadelphia, bridge, 49th Street and Kingsessing Avenue, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

280 Tons, Philadelphia, bridge, Margaret and Lefevre Streets, to American Bridge Co., Pittsburgh.

275 Tons, Otsego County, N. Y., State highway bridge, to American Bridge Co., Pittsburgh.

260 Tons, Philadelphia, transformer poles for Philadelphia Electric Co., to Ingalls Iron Works Co., Birmingham.

215 Tons, New York, Hutchinson River Parkway, contract H9, to American Bridge Co., Pittsburgh.

210 Tons, Bayonne, N. J., heat exchanger, to Savary & Glaeser Co., Dunellen, N. J.

200 Tons, New Brunswick, N. J., tape building for Johnson & Johnson, to American Bridge Co., Pittsburgh.

180 Tons, Smethport, Pa., McKean County Court House, to Ernst Iron Works, Buffalo.

175 Tons, nine bridges for New York Central Railroad near Kingston, N. Y., to an unnamed fabricator.

170 Tons, W. Seneca, N. Y., State bridge RC-40-53, to Bethlehem Steel Co., Bethlehem, Pa.

155 Tons, Franklin County, Pa., bridge, route 264-B, to Fort Pitt Bridge Works Co., Pittsburgh.

150 Tons, Bridgeport, Conn., addition for Bullard Co., to Taylor-Fitcher Steel Construction Co., Inc., New York.

150 Tons, Erie County, N. Y., State highway project, to Bethlehem Steel Co., Lackawanna, N. Y.

150 Tons, Tunkhannock, Pa., reconstruction, State highway bridge, to Pine Brook Iron Works, Scranton, Pa.

135 Tons, Bellwood Park, N. J., Erie Railroad bridge, to American Bridge Co., Pittsburgh.

130 Tons, Trenton, N. J., Garden Apartments, to Belmont Iron Works, Philadelphia.

120 Tons, Elmira, N. Y., East Church Street bridge, to American Bridge Co., Pittsburgh.

105 Tons, New York, Salvation Army building, 213 East 52nd Street, to Dreier Structural Steel Co., New York.

SOUTH AND SOUTHWEST

1450 Tons, Alcoa, Tenn., pot rooms for Aluminum Co. of America, to Converse Bridge & Steel Co., Chattanooga, Tenn.

1400 Tons, Watts Bar Dam, Tenn., 20 radial spillway gates for TVA, to Hunter Steel Co., Pittsburgh.

930 Tons, La Grange, Tex., State highway bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

400 Tons, Langley Field, Va., airplane landing mats, to Reliance Steel Products Co., Pittsburgh.

320 Tons, Artesia, N. M., State bridges FAS-206-F, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

140 Tons, Roswell, N. M., State bridge FAP-163-C, to American Bridge Co., Pittsburgh.

CENTRAL STATES

4185 Tons, Savanna, Ill., 44 magazines, to Bethlehem Steel Co., Bethlehem, Pa.

1800 Tons, Dayton, Ohio, airplane repair deck, Patterson Field, to R. C. Mahon Co., Detroit.

810 Tons, Taylorville, Ill., coal washing plant, to Pan-American Bridge Co., New Castle, Ind.

450 Tons, Cleveland, Warner & Swasey Co. plant addition, to Patterson-Leitch Co., Cleveland.

240 Tons, Smithville, Minn., bridge, to American Bridge Co., Pittsburgh.

200 Tons, Chicago, Sherwin-Williams Co. chemical products building, to Joseph T. Ryerson & Son, Inc., Chicago.

115 Tons, Logansport, Ind., factory building, to Hugh J. Baker & Co., Indianapolis.

110 Tons, Lafayette County, Wis., bridge, to Midland Structural Steel Co., Cicero, Ind.

WESTERN STATES

3446 Tons, Kettle Falls, Wash., superstructure, relocation of Great Northern Railroad bridge over Columbia River, to American Bridge Co., Pittsburgh.

2465 Tons, Los Angeles, five buildings for Aluminum Co. of America, to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.

230 Tons, Minturn, Colo., State highway bridge, to Kansas City Structural Steel Co., Kansas City.

157 Tons, Shasta County, Cal., Fender Ferry bridge over Pit River for Public Roads Administration, to Moore Dry Dock Co., Oakland, Cal., through E. E. Smith, Albany, Cal., contractor.

150 Tons, Boulder City, Nev., Navy hangar (Specification 9878), to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa, through Charles J. Dorfman, Los Angeles, contractor.

140 Tons, Colorado Springs, Colo., highway bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

1700 Tons, Queens, N. Y., Woodrow Wilson High School.

1200 Tons, Quonset Point, R. I., double unit hangar for Navy.

950 Tons, Newport, R. I., Government explosive manufacturing building and storehouse; Tredennick, Billings Co., Boston, contractor.

650 Tons, New Brunswick, N. J., manufacturing building for Triangle Conduit Cable Co.

570 Tons, Laphams Mills, N. Y., State bridge RC-40-66.

540 Tons, Mercer City, Pa., viaduct.

420 Tons, Pittsburgh, alterations McCreery Building.

400 Tons, Bound Brook, N. J., plant for Bakelite Co.

330 Tons, Somerset, Mass., power station extension for Montaup Electric Co.

320 Tons, Erie, Pa., factory and office building for Johnson Metal Products Co.

326 Tons, Passaic, N. J., theater building for Center Amusement Co.

265 Tons, Saltsburg, Pa., crest gates and bulkhead, Loyalhanna Dam.

200 Tons, New York State, route marker supports.

200 Tons, Brooklyn, Navy Yard scrap building.

200 Tons, Harrisburg, Pa., Army medical school.

190 Tons, Bridgeport, Conn., railroad bridge No. 36.70.

175 Tons, Niagara Falls, N. Y., du Pont laboratory.

165 Tons, Monticello, N. Y., State bridge RC-40-64.

120 Tons, Westminster, Vt., State bridge.

120 Tons, Lock Haven, Pa., addition to building and runway for Castanea Paper Co.

120 Tons, Ambridge, Pa., building extension for A. M. Byers Co.

110 Tons, Massena, N. Y., store building for J. J. Newberry Co.

CENTRAL STATES

440 Tons, Seymour, Ind., State bridge, contract No. 1997.

365 Tons, Dearborn, Mich., Wayne County grade separation.

340 Tons, Rolling Prairie, Ind., State bridge, contract No. 1993.

300 Tons, Centerville, Ill., State highway bridge; bids July 26.

280 Tons, Wausau, Wis., office building for Employers Mutual Insurance Co.

220 Tons, Evansville, Ind., State bridge, contract No. 1996.

220 Tons, Milbank, S. D., State bridge FAGH-119.

200 Tons, Red Lake Falls, Minn., State bridge No. 5921; bids Aug. 2.

140 Tons, Minneapolis, machine shop addition for Northern Pump Co.

126 Tons, Miami and Darke Counties, Ohio, State bridge; bids July 27.

Weekly Bookings of Construction Steel

Week Ended →	July 23, 1940	July 16, 1940	June 25, 1940	July 25, 1939	Year to Date 1940	Year to Date 1939
Fabricated structural steel awards	29,925	49,125	14,900	19,150	483,880	557,175
Fabricated plate awards	3,450	2,825	105	870	86,405	95,010
Steel sheet piling awards	0	4,510	485	1,790	26,025	41,655
Reinforcing bar awards	12,225	8,100	6,350	11,535	252,135	279,600
Total Letting of Construction Steel	45,600	64,560	21,840	33,345	848,445	973,440

WESTERN STATES

900 Tons, Puget Sound Navy Yard assembly shop, Bremerton, Wash.

300 Tons, Walla Walla, Wash., Continental Can Co. plant; Austin Co., Cleveland, contractor.

FABRICATED PLATES

AWARDS

3250 Tons, Santa Ana, Cal., Los Angeles Metropolitan Water District Orange County feeder (Specification 335, Schedule 37SC), to Consolidated Steel Corp., Los Angeles, through Macco Construction Co., Clearwater, Cal., contractor.

200 Tons, Oakdale, Cal., pipe for Carmichael Irrigation District, to Western Pipe & Steel Co., San Francisco.

PENDING PROJECTS

250 Tons, Erie, Pa., oil storage tank for Allied Oil Co., Cleveland.

SHEET PILING

PENDING PROJECTS

625 Tons, Bonneville, Ore., units 7 to 10, Bonneville power house foundations; bids Aug. 20.

Reinforcing Steel

Awards of 12,225 tons; 5150 tons in new projects

AWARDS

ATLANTIC STATES

270 Tons, Burlington, Vt., Waterman Memorial Building for University of Vermont, to Truscon Steel Co., Boston.

115 Tons, Deer Park, Long Island, State hospital, to Igoe Brothers, Newark, N. J.

114 Tons, Otsego County, N. Y., bridges, to Truscon Steel Co., Youngstown, through Arute Brothers.

100 Tons, Worcester, Mass., Monsanto Chemical Co. plant, to Truscon Steel Co., Boston, through J. G. Roy & Sons Co., contractor.

SOUTH AND CENTRAL

1900 Tons, Evanston, Ill., superstructure, technological building, Northwestern University, to Joseph T. Ryerson & Son, Inc., Chicago.

911 Tons, Savanna, Ill., 44 powder magazines, to Truscon Steel Co., Youngstown, through Monbatton Construction Co., Muskogee, Okla., general contractor.

637 Tons, Springfield, Ill., housing project, to Missouri Rolling Mill Corp., St. Louis, through Selmey Co., Bloomington, Ill., general contractor.

400 Tons, La Grange, Ill., bridge, Mannheim road, to Joseph T. Ryerson & Son, Inc., Chicago.

360 Tons, Chicago, factory building, Continental Can Co., to Inland Steel Co., Chicago.

340 Tons, Phoenix City, Ala., Government housing project, to Ceco Steel Products Co., Jersey City, N. J.

190 Tons, Chattanooga, Tenn., public service building, to Truscon Steel Co., Youngstown, through Harmon Construction Co.

130 Tons, Harrison-Pendleton Counties, Ky., highway project, FA-366-C, to Pollak Steel Co., Cincinnati, through R. E. Mills & Wood & Barton Co.

100 Tons, Atlanta, incinerator for city, to Truscon Steel Co., Youngstown, through Hardaway Construction Co.

100 Tons, Minneapolis, parking ramp, to Truscon Steel Co., Youngstown.

Unstated tonnage, Montgomery Ala., Riverside housing project: first unit to Conners Steel Co.; second unit to Ceco Products Co., Jersey City, N. J.

WESTERN STATES

2835 Tons, Oakland, Cal., Fleet Supply Base storehouse (Specification 9686), to Ceco Steel Products Co., San Francisco, through Johnson, Drake & Piper, Oakland, contractor.

2000 Tons, Oakland, Cal., four storehouses at Fleet Supply Base (Specification 9795), to Bethlehem Steel Co., San Francisco, through N. P. Severin Co., Chicago, contractor.

400 Tons, Berkeley, Cal., University of California administration building, to Soule Steel Co., San Francisco, through K. E. Parker Co., San Francisco, contractor.

335 Tons, Friant, Cal., San Joaquin River bridges, to Soule Steel Co., San Francisco, through Campbell Construction Co., Sacramento, Cal., contractor.

320 Tons, Alameda, Cal., four land plane hangars at Naval Air Station (Specification 9185), to Truscon Steel Co., San Francisco, through Robert E. McKee, Los Angeles, contractor.

295 Tons, Davis, Cal., six bridges, to Kyle & Co., Fresno, Cal., through E. T. Lesure, Oakland, Cal., contractor.

225 Tons, Alameda, Cal., recreation building and officers' quarters at Naval Air Station, to Ceco Steel Products Co., San Francisco, through Moore & Roberts, San Francisco, contractors.

143 Tons, Alameda, Cal., operation building and other structures at Naval Air Station, to W. S. Wetenhall Co., San Francisco, through Martinelli Construction Co., San Francisco, contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

230 Tons, New York, East River Drive, contract 32; bids July 25.

154 Tons, Bristol Hills, N. H., road and bridge; Littleton Construction Co., Littleton, N. H., contractor.

CENTRAL STATES

950 Tons, near Marion, Ill., Veterans' Hospital; Swanson Construction Co., Kansas City, low bidder on general contract.

675 Tons, Detroit, post office garage.

140 Tons, St. Paul, Northern States Power Co.

130 Tons, Newport, Mich., plant, for Cudahy Packing Co.

100 Tons, St. Louis County, Mo., Wabash Railroad.

WESTERN STATES

920 Tons, Frink, Cal., All-American Canal (Invitation B-42,493-A); bids in.

610 Tons, Fortuna, Ariz., Gila project (Invitation 24749-A); bids in.

580 Tons, Mare Island, Cal., machine shop foundations; Barnes Construction Co., Santa Monica, Cal., low bidder.

180 Tons, Fresno, Cal., city hall; L. H. Hansen & Sons, Fresno, Cal., low bidders.

152 Tons, Kettle Falls, Wash., Columbia River reservoir (Invitation B-38408-A); bids in.

111 Tons, Portland, Ore., pumping plant for Sauvie Island Drainage District; bids Aug. 2.

CANAL ZONE

203 Tons, Panama Canal Zone, schedule No. 4164; bids in.

Cast Iron Pipe

Lynn, Mass., has closed bids on a tonnage of 10-in. cement lined class B pipe.

Emory, Tex., plans pipe lines for water system and other waterworks installation, installation, including elevated steel tank and tower. Cost about $35,000. Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Harris County Water Control and Improvement District No. 3, 706 Garden Oaks Boulevard, Houston, Tex., asks bids until July 29 for cast iron pipe and fittings for water system; also for gate valves, fire hydrants, etc. J. C. McVea, 6902 Main Street, is district engineer.

Mansfield, Ohio, plans pipe line extensions in water system in several streets. Cost about $65,000.

Fort Madison, Iowa, plans pipe line extensions in water system, including main trunk lines; also other waterworks installation. Cost about $567,000. Special election has been called July 29 to approve bond issue in that amount.

Newbury, Mass., plans about five miles of pipe for extensions in water system and other waterworks installation. Cost about $75,000. Whitman & Howard, 89 Broad Street, Boston, are consulting engineers.

Orlando Utilities Commission, Orlando, Fla., plans pipe line extensions in water system and other waterworks installation. Cost over $250,000.

State Purchase Commissioner, Room 318, State House, Trenton, N. J., asks bids until July 31 for heavy cast iron pipe.

Board of Hamilton Township Commissioners, 2090 Greenwood Avenue, Trenton, N. J., plans pipe lines for water system extensions in township; also for new water station, including three wells, electric-operated pumping station and other facilities, with two elevated steel tanks and towers. Entire project to cost close to $500,000. Clyde Potts, 30 Church Street, New York, is consulting engineer.

Alvord, Tex., plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower. Bond issue of $44,000 has been approved for project. Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Colorado Springs, Colo., has awarded contract to American Cast Iron Pipe Co., at $74,537.94, for 30-in. pipe and fittings for new main line from Manitou hydroelectric plant to Mayfair Avenue, Manitou Springs district, for water supply.

Pipe Lines

Northern Natural Gas Co., Aquila Court, Omaha, Neb., plans new welded steel pipe line from connection with main trunk line to Estherville, Iowa, for natural gas transmission to latter place, where service will be furnished. Also will make extensions and replacements in present distributing system in municipality noted. A similar project will be carried out at Griswold, Iowa, including improvements and replacements in present main pressure pipe line for natural gas supply to that city, and extensions and replacements in local distribution system. Entire project will cost over $85,000.

Peoples Gas & Water Co., Meridian, Miss., has awarded contract to Youngstown Sheet & Tube Co., for welded steel pipe for extensions in system at Meridian and Columbus, Miss., comprising about 19,000 ft. of 6-in. and 16,000 ft. of 4-in. First noted will be used for natural gas transmission to new mill of Flintkote Co., near Meridian municipal airport; 12,600 ft. of 4-in. will be required for pipe line to local housing development, where natural gas will be furnished, as well as for new high-pressure loop around municipality; about 4000 ft. of 4-in. will be used for extensions and improvements in main pipe line and distribution system at Columbus. Municipal installations will include regulators and control equipment, meters and accessory equipment. Cost close to $150,000.

Magnolia Pipe Line Co., Esperson Building, Houston, Tex., subsidiary of Magnolia Petroleum Co., same address, will begin work soon on new welded steel pipe line from oil refinery of parent company to Oklahoma City, Okla., about 200 miles, for gasoline transmission to latter place, where connection will be made with bulk terminal plant. Cost over $1,000,000 with booster pumping stations and other operating facilities.

United States Engineer Office, Vicksburg, Miss., asks bids until July 31 for 20 sections of 16-in. inside diameter, ⅜-in. shell, steel pipe, each section 30 ft. long (Circular 8).

Bureau of Supplies and Accounts, Navy Department, Washington, closes bids July 30 for steel tubing and pipe fittings for Boston Navy Yard (Schedule 2408).

Bureau of Reclamation, Denver, takes bids July 25 on 12,938 ft. of galvanized, corrugated metal pipe and coupling bands for delivery at Kettle Falls, Wash. (Invitation B-38 409-A).

Los Angeles Department of Water and Power has awarded about 1400 tons of 6 and 8-in. pipe to United States Pipe & Foundry Co., San Francisco; 800 tons of 12-in. pipe to National Cast Iron Pipe Co., Los Angeles; and 675 tons of 8-in. pipe to American Cast Iron Pipe Co., Los Angeles.

Illinois Pipe Line Co., Findlay, Ohio, plans 8-in. welded steel pipe line from Bridgeport to Centerville, Ill., about 50 miles, for crude oil transmission. Bulk storage plant will be located at latter place, including three 50,000-bbl. steel tanks and other facilities.

Pure Oil Co., Tulsa, Okla., plans welded steel pipe line from oil field near New Cumberland, Okla., to Aylesworth, Okla., about 16 miles, for crude oil transmission. Connection will be made with pipe line system of Texas Co. at latter point. Main offices are at 35 East Wacker Drive, Chicago.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES									(Coatesville and Claymont = 2.10¢)						
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢										
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢										
Spring	3.20¢	3.20¢		3.20¢	3.20¢										
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			(Terra Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in to 8 in.	$54.00
8 in. to 12 in.	52.00
12 in to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. inclusive	62
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. through 1½ in.	62	62
1⅝ in. and larger	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	75 and 10
Stove bolts in packages, with nuts attached	75
Stove bolts in bulk	83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	July 17	July 18	July 19	July 20	July 22	July 23
Copper, Electrolytic[1]	11.50	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	51.00	51.00	51.00	....	51.00	51.125
Zinc, East St. Louis[2]	6.25	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis[3]	4.85	4.85	4.85	4.85	4.85	4.85

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New York	Cleveland
Straits pig	52.25	56.50
Copper		
Lake	13.25	12.625
Electro	12.75	12.625
Castings	12.375	12.375
H. R. sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow, sheets*	18.56	18.56
Yellow, rods*	13.55	13.55
Seamless tubes*	21.31	21.31
Zinc		
Slabs	7.60	7.75
Sheets, No. 9 casks	12.00	12.00
Lead		
American pig	6.10	5.50
Bar	8.05	8.25
Cut sheets	8.25	8.25
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.50	21.50
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.625	32.50
Babbitt		
Anti-friction grade	22.25	22.00

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy, crucible	8.375	9.00
Hvy. and wire	7.375	7.75
Light and bottoms	6.375	6.875
Brass		
Heavy	4.75	5.25
Light	3.625	4.375
No. 1 yel. turn	4.50	5.50
No. 1 red or compo. turnings	7.125	7.625
Hvy.Mach.compo.	7.375	8.00
Lead		
Heavy	4.00	4.375
Aluminum		
Cast	8.50	9.50
Sheet	13.50	14.50
Zinc	3.25	4.00

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 19c.-20c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $200 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.50c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade ..... 2.70c.
Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

E
E
• Behind this letter "E" are years of experience and a plant geared to produce bolting to exacting specifications—for pressure, temperature and corrosion resistance. Erie specialized bolting is available in Alloy, Stainless and Carbon Steels, and Bronze. Consult Erie for bolting to your specifications.
ERIE BOLT & NUT CO
ERIE, PA., U. S. A.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d.13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d.13 B.W.G.	10.67	9.26	....
1½ in. o.d.13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d.13 B.W.G.	13.42	11.64	11.06
2 in. o.d.13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d.13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d.12 B.W.G.	18.45	16.01	15.16
2½ in. o.d.12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d.12 B.W.G.	21.42	18.59	17.54
3 in. o.d.12 B.W.G.	22.48	19.50	18.35
3½ in. o.d.11 B.W.G.	28.37	24.62	23.15
4 in. o.d.10 B.W.G.	35.20	30.54	28.66
4½ in. o.d.10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2.000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+30
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54

Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

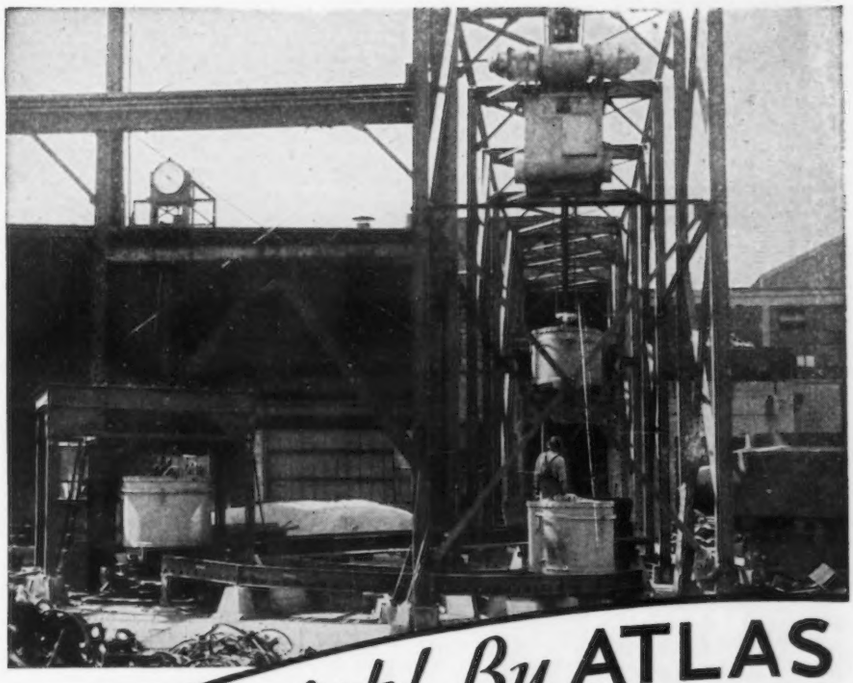
Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.



An Assist! By ATLAS

View at Prominent Iron Foundry

To Lower Costs!

Here Atlas-designed, Atlas-built equipment moves heavy scrap and other charging materials with consummate ease.

Monorail deposits empty bucket on roller conveyor. Bucket *rolls down* to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket *rolls down* to monorail for pick-up and charge to cupola.

A propitious circle, presaging profit at the year-end—and a definitely typical Atlas installation.

THE ATLAS CAR & MFG. CO.

Engineers **CLEVELAND, OHIO** ***Manufacturers***

serving the world with mobile handling equipment

ORES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, bessemer, 51.50%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%....	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%.....	4.35

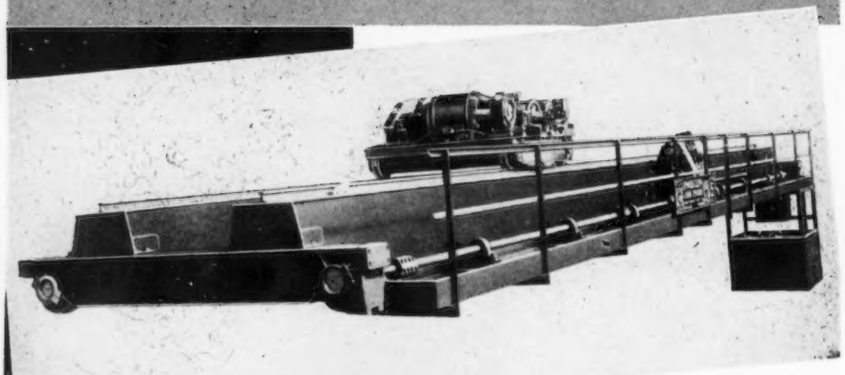
Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

	Per Unit
Algerian, low P, Cu free, dry, 55 to 58% Fe	12c.
Caucasian, washed, 52% Mn.	60c.
African, Indian, 44 to 48% Mn.	50c.
African, Indian, 49 to 51% Mn.	55c.
Brazilian, 46 to 48% Mn.	53c.
Cuban, del'd, duty free, 51% Mn.	72c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$23.50
Tungsten, domestic scheelite, delivered	23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	Nom.
Rhodesian, 45%	$23.50
Rhodesian, 48%	27.50

YOUR NEW OVERHEAD CRANES SHOULD BE "*Shaw-Box*"!



FEATURES
of the
TYPE "S" CRANE

ALL STEEL "SHAWELD" CONSTRUCTION
•
ANTI-FRICTION BEARINGS
•
DIRECT BRIDGE DRIVE
•
ROTATING WHEEL AXLES
•
TAPER TREAD WHEELS
•
"SHAWELD" GEARS
•
HYDRAULIC BRIDGE BRAKE
•
ALL PARTS OPERATING IN OIL BATHS

You Pay No Price Premium For This Modern Crane

When you buy "Shaw-Box" Cranes you always buy the most modern cranes there are . . . You buy cranes that have been developed to meet today's and tomorrow's handling problems. You buy leaders! . . . Today you will find engineering advancements and construction advantages that first made their appearance on "Shaw-Box" Cranes on nearly all makes of cranes.

Among the wide variety of "Shaw-Box" Standard Cranes you will find a type exactly suited to your needs whether they be for an electric traveling crane to handle 450 tons or a small hand operated crane to handle 500 pounds . . . All types are built up from modern standardized machinery units produced in large quantities under mass production methods, therefore, you pay no price premium for the advanced engineering and operating advantages that you can only get in "Shaw-Box" Cranes.

Catalogs illustrating all types and containing specifications and dimensions will be gladly sent free. — Send for them! And, *be sure to have "Shaw-Box" quote on all your crane and hoist requirements.*

SHAW-BOX CRANE & HOIST DIVISION
MANNING, MAXWELL & MOORE, INC.
402 BROADWAY MUSKEGON, MICHIGAN

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$20.00
Domestic, f.o.b. Ohio River landing barges	20.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	$20.50 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	$25.00 to $25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$31.00
As above, in bags, f.o.b. same mines	$32.60

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.
For each unit of manganese over 2%, $1 per ton additional.
Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd $2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f. o. b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton $58.50
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J.....4.75c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland.5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.3.75c.
No. 6 industrial, del'd Cleveland.3.25c.

AMPCO METAL

IS OFTEN THE ANSWER

IF you require a non-ferrous alloy that provides the utmost in wear resistance — tensile strength — corrosion resistance . . . then you have a job for Ampco Metal.

Time and again — for hundreds of manufacturers, Ampco Metal has proved its value in a wide variety of applications, ranging from cams, shifters, nuts, gears, bushings and bearings, to forming and drawing dies and acid resistant equipment. Time and again it has proved its ability to outlast other alloys in difficult services — that it can actually outwear hardened steel.

In some one of its six grades Ampco Metal can probably solve a problem for you — why not check with us.

AMPCO METAL, INC., Dept. IR-725, Milwaukee, Wis.

"The Metal without an Equal"

AMPCO METAL

. . . distinguished by this mark.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$4.25 to $4.50

Foundry, f.o.b. Connellsville, prompt .....$5.25 to 5.50

F'dry, by-product, Chicago.... 10.50

F'dry, by-product, New England 12.50

Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90

F'dry, by-product, Philadelphia 11.13

F'dry, by-product, Cleveland... 11.05

F'dry, by-product, Cincinnati.. 10.50

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export. £17 18s.

Tin plate, per base box 32s. to 33s.

Steel bars, open hearth £13 9s.

Beams, open hearth.... £12 2s. 6d.

Channels, open hearth.. £12 2s. 6d.

Angles, open hearth.... £12 2s. 6d.

Black sheets, No. 24 gage £18 17s. 6d. max.*; £18 17s. 6d. min.**

Galvanized sheets, No. 24 gage £19 10s. max.*; £19 10s. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$24.50***	***$24.00***	***$25.50***	***$25.00***	.....
Brooklyn	***26.50***	.....	.....	***27.00***	.....
Jersey City	***25.53***	***25.03***	***26.53***	***26.03***	.....
Philadelphia	***24.84***	***24.34***	***25.84***	***25.34***	.....
Bethlehem, Pa.	$24.00	$23.50	$25.00	$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	***23.44***	***23.61***	.....	***24.11***	.....
Canton, Ohio	***24.39***	***23.89***	***24.89***	***24.39***	.....
Mansfield, Ohio	***24.94***	***24.44***	***25.44***	***24.94***	.....
St. Louis	***23.50***	***23.02***	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	***25.63***	.....	***26.13***	***25.63***	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$22.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.45	$3.18	$3.30	$3.48	$4.10
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	....	4.12	4.35	4.43	6.30
Sheets, galvanized	4.75	4.60	4.42	4.50	4.30	4.64	4.45	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	....	3.41	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb. St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.

ANNOUNCEMENT

4 strong nationally known companies now join hands under the name of

THE HILL ACME COMPANY

★ The Hill Clutch Machine & Foundry Company, Cleveland
★ The Acme Machinery Company, Cleveland
★ The Cleveland Knife & Forge Company, Cleveland
★ The Canton Foundry & Machine Company, Cleveland
(formerly of Canton, Ohio)

The Hill Clutch Machine & Foundry Company, owner of The Cleveland Knife & Forge Company and The Canton Foundry & Machine Company, has purchased

THE ACME MACHINERY COMPANY • CLEVELAND

and effective July 1, 1940, all four companies will be known as The Hill Acme Company. The combined engineering, manufacturing and distributing facilities of our four companies, soundly financed, under one successful management, will give our customers the advantages of the most modern production methods, a large and competent engineering staff, and experimental departments for the constant improvement of our products.

Products of Divisions

HILL **DIVISION**
Hydraulic Precision Surface Grinders—Plate, Sheet and Strip Grinding and Polishing Machines—Power Transmission Machinery—Special Machinery.

CLEVELAND KNIFE **DIVISION**
Solid and Laid Steel Shear Blades—Rotary Slitting Cutters—Machine Knives.

CANTON SHEAR **DIVISION**
All-Steel Alligator Shears—Portable Floor Cranes—Industrial Turntables.

ACME MACHINERY **DIVISION**
Forging, Threading and Tapping Machines—Bolt, Nut and Rivet Machinery.

THE HILL ACME COMPANY

Plants at 6400 Breakwater Avenue and 4535 St. Clair Avenue • CLEVELAND, OHIO

Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

● **Anaconda Wire & Cable Co.,** 25 Broadway, New York, has plans for one-story addition to branch mill at Marion, Ind. Cost close to $50,000 with equipment.

Vulcan Rail & Construction Co., Maspeth, L. I., architectural and ornamental iron products, has filed plans for new one-story shop. Cost close to $45,000 with equipment. Koch & Wagner, 32 Court Street, Brooklyn, are architects.

Bureau of Yards and Docks, Navy Department, Washington, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for 16-story main storage and distributing building at Brooklyn Navy Yard for heavy duty service, about 21 acres of floor space. Cost close to $4,000,000 with mechanical-handling and other equipment, for which awards will be made separately.

Rare Chemicals, Inc., Yonkers, N. Y., industrial and other chemical products, has acquired property at Middlesex, near Sayreville, N. J., for new one-story plant, for which plans will be drawn soon. Completion is scheduled in about six months. Facilities will be provided for about 125 workers. Cost over $75,000 with equipment.

Continental Oil Co., 10 Rockefeller Plaza, New York, plans new bulk oil storage and distributing plant near Beeville, Tex., with steel storage tanks, pumping station and other facilities. Cost close to $65,000 with equipment.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., will purchase machine tools for arsenal shops during fiscal year, as part of national defense program, for which appropriations are being allotted. Also will purchase on bids scheduled to be asked soon 20-mm. automatic aircraft cannon, 90-mm. anti-aircraft guns, 155-mm. guns, 60 and 81-mm. mortars, 37-mm. tank guns; and 105-mm., 75-mm., and 8-in. howitzers.

Berst-Forster-Dixfield Co., 155 East Forty-fourth Street, New York, manufacturer of tissue and other paper stocks, waxed and processed papers, will take bids soon on general contract for two additions to mill at Plattsburg, N. Y., four stories, 50 x 95 ft., and two stories, 45 x 60 ft., respectively. Cost close to $100,000 with equipment.

Refining, Inc., 30-30 Northern Boulevard, Long Island City, refined vegetable oils, plans new one-story plant on North Tryon Street, Charlotte, N. C., where about two acres recently was acquired. Cost over $75,000 with equipment. J. N. Pease, 1236 East Morehead Street, Charlotte, is architect.

Mueller Brass Co., Port Huron, Mich., brass and copper products, has approved plans for new one-story factory branch, storage and distributing plant at 362-72 Elizabeth Avenue, Newark, N. J., for which superstructure will proceed at once. Cost over $50,000 with equipment. When completed company will remove present branch at 271 Badger Avenue to new location. Ballinger Co., 105 South Twelfth Street, Philadelphia, is architect and engineer.

Magor Car Corp., Slade Street, Athenia, N. J., railway and industrial cars, springs, etc., has let general contract to Samworth-Hughes Co., 177 Van Houten Street, Paterson, N. J., for one-story addition, 75 x 140 ft. Cost over $80,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Bridesburg, Philadelphia, plans early purchase of forgings for artillery projectiles, metal parts for percussion primers, flank spotting instruments, anti-aircraft directors, stereoscopic testing instruments, gunners quadrants, electric generating units, brass cartridge cases of various calibers, fire control sets for cal. .50 and 37-mm. guns, and machine tools for arsenal shops.

Carpenter Steel Co., Reading, Pa., has let general contract to Reading Contracting Co., 622 Court Street, for one-story addition, 190 x 800 ft., for expansion in wire-manufacturing division. Cost over $200,000 with equipment. Muhlenberg, Yerkes & Muhlenberg, Ganster Building, are architects.

Buffalo District

● **B. F. Goodrich, Co.,** South Main Street, Akron, Ohio, has let general contract to Walter S. Johnson Building Co., 2532 Hyde Park Boulevard, Niagara Falls, N. Y., for new mill at Niagara Falls for production of synthetic rubber, to operate under an electric process. Cost over $200,000 with equipment.

Worthington Pump & Machinery Corp., Clinton and Robert Streets, Buffalo, will equip one-story addition, 115 x 145 ft., for which general contract recently was let to Austin Co., Cleveland, for expansion in assembling and testing departments for larger sized gas and diesel engine units; a 40-ton craneway will be installed and other mechanical-handling facilities. Cost over $85,000 with machinery. Main offices are at Harrison, N. J.

Remington-Rand, Inc., South Main Street, Elmira, N. Y., typewriters and other office machines and parts, plans one-story addition. Cost over $50,000 with equipment.

New England

● **L. S. Starrett Co.,** Crescent Street, Athol, Mass., small tools and mechanical specialties, has asked bids on general contract for four-story addition, with one and two-story sections. Cost over $85,000 with equipment. Charles T. Main, Inc., 201 Devonshire Street, Boston, is consulting engineer.

Bureau of Yards and Docks, Navy Department, Washington, has appropriation of about $1,200,000 for expansion and improvements at Portsmouth Navy Yard, N. H., including one-story addition to machine shop, $185,000 with equipment; new shipways with mechanical-handling facilities, $295,000; conversion of building No. 96 for foundry, $77,000; conversion of other buildings, No. 81, 89 and 115, for shop service, $78,000; and new overhaul shop cranes, $36,000.

Atlas Plywood Corp., 20 Providence Street, Boston, has acquired former pulp and paper mill of Advance Bag & Paper Co., Howland, Me., and will modernize section of mill previously used for paper-making for new plywood packaging plant, consolidating another Maine mill of company at that location. Cost over $100,000 with mechanical-handling and other machinery.

Warren Telechron Co., Ashland, Mass., electric clocks and parts, a subsidiary of General Electric Co., plans one-story addition, including enlargement in steam power house. Cost close to $50,000 with equipment.

Helo-Krome Screw Corp., Brook Street, Elmwood, Conn., is erecting one-story, 100 x 200 ft., plant addition. R. G. Bent Co., 93 Edwards Street, Hartford, is contractor.

Washington District

● **Constructing Quartermaster,** Langley Field, Va., plans one-story addition to mechanical shop; one-story storage and distributing building for signal and ordnance service, and addition to steel hangar. Fund of $220,000 has been authorized.

Virginia Smelting Co., West Norfolk, Va., plans one-story addition, for which bids will be asked soon on general erection. Cost over $50,000 with equipment. Ballinger & Co., 105 South Twelfth Street, Philadelphia, is architect and engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 29 for steel bolts and miscellaneous parts (Schedule 4171); until July 31, one gasoline-driven, crawler-type tractor (Schedule 4165).

Richmond, Fredericksburg & Potomac Railroad Co., Richmond, Va., has approved plans for one-story addition to warehouse at 1200 West Broad Street. Cost about $65,000 with mechanical-handling and other equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Aug. 14 for turbine and motor-driven pumping units, fuel oil pumping, heating and storage equipment, heat exchangers, distilled and feedwater storage tanks, air filters, special valves, de-superheaters, steel stacks, piping systems, etc., for power house at Pearl Harbor, T. H., Navy Yard (Specifications 9509).

Bureau of Prisons, Department of Justice, Washington, has let contract to Bickelhaupt, Inc., 1737 Summit Avenue, Richmond, Va., for new boiler house at Federal reformatory, Petersburg, Va., at $62,876.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until July 29 for 30,000 galvanized steel drums, each 10-gal., for gasoline service, and 30,000 flexible nozzle tubes (Circular 398-11).

Bureau of Yards and Docks, Navy Department, Washington, has appropriation of $300,000 for new steel storage tanks and accessories for Naval Station at Tutuila, Samoa, of which $200,000 will be used for fuel oil units, $50,000 for diesel oil tanks, and $50,000 for gasoline tanks.

South Atlantic

● **Seaboard Airline Railway,** Norfolk, Va., has asked bids on general contract for one-story shop, 50 x 160 ft., at yards at Miami, Fla., for diesel engine repairs and maintenance. Cost over $65,000 with equipment. W. D. Faucette, chief engineer, first noted address, is in charge.

United States Engineer Office, Jacksonville, Fla., asks bids until Aug. 2 for machinery, electrical equipment and system, and central control station at St. Lucie Canal, near Stuart, Fla. (Circular 1).

Bureau of Yards and Docks, Navy Department, Washington, has fund of $300,000 for new shops and buildings, and other structures at Naval Station, Parris Island, S. C., during fiscal year.

Southwest

● **Fahlin Aircraft Co.,** Marshall, Mo., has leased one-story building, 40 x 120 ft., to be erected by City Council, Columbia, Mo., at municipal airport, for new plant for parts production and assembling. Bids are being asked for erection. Cost close to $50,000 with equipment. Stephen A. Deming, city engineer, Columbia, in charge.

Pittsburgh-Erie Saw Corp., 1569 Tower Grove Avenue, St. Louis, saws and other cutting tools, has let general contract to W. C. Harting Construction Co., 722 Chestnut Street, for one-story addition. Cost close to $45,000 with equipment. Main offices are at 4017 Liberty Avenue, Pittsburgh.

City Council, Little Rock, Ark., plans expansion in municipal airport, where additional tract of about 188 acres is being secured. Project will include new steel hangars, with repair and reconditioning facilities; shops, oil and gasoline storage facilities, administration building and other structures. Cost about $525,000 with equipment.

Chicago Bridge & Iron Co., 2919 Main Street, Houston, Tex., steel tanks and towers,

It Makes Your Daily Grind Easier and More Accurate

. . . ON ALL SMALL TOOLS & PARTS

Plants which have installed new Taft-Peirce No. 1 Precision Surface Grinders find that their operators turn out better work and more of it with far less effort. Wheel-travel in all directions is on ball bearings, table can be moved with one finger. Set-up is simpler, wheel-dressing easier.

If *you*, too, need flatness that is consistently accurate to closer limits than you can now attain, then the Taft-Peirce No. 1 is *your* surface grinder. The wheelhead of this completely different machine tilts to facilitate the grinding of angular and shoulder work, or undercuts. It will give you better finish and will enable you to handle work that can't be handled on conventional grinders. Write today for bulletin and prices.

THE TAFT-PEIRCE MFG. CO.

WOONSOCKET *RHODE ISLAND*

and other steel products, has purchased tract on Clinton Drive for new plant, consisting of a main one-story works, 60 x 200 ft., including structural shop and machine shop; shed, 22 x 107 ft., office unit and accessory buildings. Cost over $85,000 with equipment. Main offices are at Chicago.

Ford Motor Co., Dearborn, Mich., has let general contract to Central Contracting Co., Construction Building, Dallas, Tex., for one-story addition to assembling plant at Dallas, 280 x 300 ft. Cost about $350,000 with equipment.

South Central

● **Standard Oil Development Co.**, 26 Broadway, New York, affiliated with Standard Oil Co. of New Jersey, has purchased 75 acres near oil refinery of Standard Oil Co. of Louisiana, Baton Rouge, for new synthetic rubber mill, for which plans are being drawn. Cost over $500,000 with equipment.

Constructing Quartermaster, Barksdale Field, La., has fund of $204,000 for new shops and buildings during fiscal year, including warehouse with mechanical-handling facilities.

Vernon W. Payne, 2430 Twenty-fifth Street, Meridian, Miss., and associates are organizing company to establish local plant for manufacture of aircraft, one-story, for parts production and assembling. Cost over $50,000 with equipment.

Mississippi River Commission, Vicksburg, Miss., asks bids until Aug. 6 for one offset duplicatng press, vertical plate coating machine, registering vacuum printing frame with layout and register table, and accessories (Circular 2).

Western Pa. District

● **Aetna-Standard Engineering Co.**, Ellwood City, Pa., iron and steel products, has approved plans for one-story addition, 100 x 350 ft., primarily for production of anti-aircraft guns for Government. Facilities will be provided for employment of about 400 men. Cost over $175,000 with equipment.

American Bridge Co., Frick Building, Pittsburgh, has plans for one-story addition to structural steel fabricating plant at Ambridge, 125 x 800 ft., for welded steel barge construction. Cost close to $1,000,000 with equipment.

Standard Stoker Co., 1701 Gaskill Avenue, Erie, Pa., stokers and parts, has let general contract to H. Platt Co., 922 Raspberry Street, for one-story addition. Cost close to $40,000 with equipment.

Ohio and Indiana

● **Springfield Mfg. Co.**, Springfield, Ohio, flywheel gears, etc., has let general contract to Owen Beatty, Springfield, for two one-story additions, 40 x 100 ft., for shop expansion, and 30 x 60 ft., for storage and distribution. A 10-ton traveling crane will be installed in first noted unit. Cost over $50,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has let general contract to Rust Engineering Co., Clark Building, Pittsburgh, for one-story addition to electric refrigerator-manufacturing plant at Mansfield, Ohio, 150 x 365 ft., for expansion in stamping, enameling and other divisions, also storage and distribution. Cost over $350,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

C. L. Gougler Machine Co., Kent, Ohio, machinery and parts, will take bids soon on general contract for one-story addition. Cost close to $45,000 with equipment.

General Tire & Rubber Co., East Market Street, Akron, Ohio, will ask bids soon on general contract for five-story and basement addition. Cost close to $200,000 with equipment.

National Farm Machinery Co-operative, Inc., Shelbyville, Ind., Claude F. Brown, manager, plans one-story plant, 60 x 200 ft., for production of farm tractors and kindred equipment, including parts manufacturing and assembling divisions. Cost over $75,000 with equipment. Shelbyville Industries, Inc., Shelbyville, will be in charge of erection.

Southern Indiana Light & Power Corp., Columbus, Ind., plans rebuilding diesel engine-generating station near Markland, Ind., used for auxiliary service, recently destroyed by fire. Loss about $50,000 with equipment.

Michigan District

● **Detroit Tap & Tool Co.**, 8432 Butler Street, Detroit, has asked bids on general contract for one-story addition. Cost over $45,000 with equipment. Henry M. Freier, Murphy Building, is architect.

Consumers Pipe Co., 14035 Grand River Boulevard, Detroit, pipe and fittings, plans one-story shop addition. Cost close to $60,000 with equipment. Erection will begin soon.

Board of Education, Alpena, Mich., plans manual training department in new multi-story high school. Cost about $550,000. McGrath & Dohmen, 3648 Mount Elliott Avenue, Detroit, are architects.

Peninsular Grinding Wheel Co., 729 Meldrum Street, Detroit, grinding wheels and other abrasive products, has let general contract to Krieghoff Co., 6661 French Road, for one-story addition. Cost close to $50,000 with equipment. H. D. Ilgenfritz, 468 Prentiss Street, is architect.

Middle West

● **William Glader Machine Works**, 210 North Racine Avenue, Chicago, machinery and parts for cooperage and other industries, has purchased a one-story and basement building at 1241 West Lake Street, 75 x 160 ft., for plant, expanding present capacity.

Constructing Quartermaster, Savanna Ordnance Depot, Savanna, Ill., has appropriation of $706,000 for addition to local ammunition loading plant, including machinery installation.

Deere & Co., Moline, Ill., agricultural implements and equipment, will take bids soon on general contract for new one-story plant, 120 x 230 ft., at Madison, Wis. Cost over $130,000 with equipment. O. A. Eckerman, first noted address, is company engineer.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Aug. 5 for mounts for 37-mm. guns (Circular 232).

Western Electric Co., Cermak Road and Forty-seventh Street, Chicago, telephone instruments and equipment, etc., plans two-story and basement addition. Cost over $80,000 with equipment.

Federated Co-operative Power Association, Hampton, Iowa, plans extensions in electric power plant, used for service for rural electric system, including additional equipment. Fund of $190,000 has been secured through Federal aid.

Convertible Door Mfg. Co., 703 South Thirty-ninth Street, Milwaukee, metal doors, etc., has let general contract to J. G. Jansen Construction Co., 3001 North Thirty-eighth Street, for one-story addition, 90 x 125 ft. Cost close to $65,000 with equipment. Schley & Sons, 735 North Water Street, are architects.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until July 31 for dynamotor ringing machines, motor-generator sets, power boards, racks, line finder shelves and other equipment (Circular 3).

Pacific Coast

● **Utility Electric Steel Foundry, Inc.**, 3334 East Slauson Avenue, Los Angeles, steel castings, plans one-story addition for expansion in foundry department. Cost close to $40,000 with equipment. Grant & Bruner, Ferguson Building, are architects.

Stuart Oxygen Co., 211 Bay Street, San Francisco, industrial oxygen, acetylene gas, etc., has organized Pacific Carbide & Alloys Co., Inc., a subsidiary, to build new plant near Portland, Ore., where site has been acquired. It will comprise several one-story units for production of calcium carbide and allied products, with machine shop, power substation and other mechanical structures. Equipment will be electric-operated and contract has been made with Administrator, Bonneville project, Portland, for power supply from Bonneville hydroelectric power development. Completion is scheduled early in fall. Cost close to $250,000 with equipment.

Bureau of Reclamation, Denver, asks bids until Aug. 1 for one 82,500-kva., vertical shaft, a.c. electric generator and auxiliary equipment for Boulder power plant, Boulder Canyon project (Specifications 923).

Bethlehem Shipbuilding Co., Twentieth and Illinois Streets, San Francisco, plans expansion at shipyard at Alameda, Cal., including new shipways, shops and other structures, with cranes, hoists and other mechanical-handling facilities, for construction of vessels for Federal Government. An appropriation of $3,175,000 is being secured through that source for project.

National Steel Construction Co., 425 Frontenac Street, Seattle, has let general contract to H. D. Stewart, 2045 West Newton Street, for one-story addition, 103 x 110 ft., for storage and distribution. Cost close to $40,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, has secured fund of $4,000,000 for fiscal year for Naval Air Station at Seattle, including aviation shore facilities, seaplane hangars, repair and reconditioning shops, oil and gasoline storage and distribution units, pumping station, power house and other structures.

Canada

● **Ford Motor Co. of Canada, Ltd.**, Windsor, Ont., has let general contract to Dinsmore-McIntyre Construction Co., Security Building, for one-story addition, 192 x 570 ft., for a machine shop. Cost over $500,000 with equipment.

Anaconda-American Brass, Ltd., Eighth Street, New Toronto, Ont., is erecting one-story addition, for which general contract recently was let to Carter-Halls-Aldinger Co., Ltd., 419 Cherry Street, Toronto, for expansion in electric casting division. Cost over $65,000 with equipment.

Powell River Co., Ltd., Vancouver, B. C., plans expansion and improvements in hydro-electric power plant at Powell River, B. C., used for service at local newsprint mill, including additional equipment. Cost close to $175,000 with equipment.

John Bertram & Sons, Ltd., 15 Flatt Avenue, Dundas, Ont., will start work soon on an addition to steel works, comprising four buildings. Hutton & Souter, 36 James Street South, Hamilton, Ont., are architects.

Canadian Westinghouse Co., Ltd., 286 Sanford Street North, Hamilton, Ont., has plans for a 450 ft. addition to cost $75,000. Hutton & Souter, 36 James Street South, are architects.

Federal Aircraft, Ltd., R. J. Moffett, care of Canadian Vickers, Ltd., Notre Dame Street East, Montreal, will build aircraft plant to cost $100,000.

Hayes Steel Products, Ltd., Merritton, Ont., has awarded general contract to Newman Brothers, 127 St. Paul Street, St. Catharines, Ont., for a plant addition.

Canada Wire & Cable Co., Ltd., Leaside, Ont., and 159 Craig Street West, Montreal, has awarded structural steel contract to Dominion Bridge Co., Ltd., Lachine, Que., for rolling mill building, 200 x 600 ft., and structural steel for casting building to Hamilton Bridge Co., Ltd., Hamilton, Ont., in connection with plant addition at Montreal East, Que.

United Steel Corp., Ltd., 317 King Street, Welland, Ont., has awarded general contract to Gardner Construction Co., Ltd., 7 River Block, for $50,000 plant addition.

Canadian National Railways, 360 McGill Street, Montreal, will call for tenders soon for locomotive terminal buildings at Fairview, N. S., to cost $50,000. W. U. Appleton, Moncton, N. B., is general manager.